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ABSTRACT

This learning packet, one in a series of eight, was developed by the Carolina Beach State Park in North Carolina for the middle grades to teach about carnivorous plants. Loose-leaf pages are presented in 10 sections that contain: (1) introductions to the North Carolina State Park System, the Carolina Beach State Park, the park's activity packet, and how plants eat; (2) a summary of the activities that includes major concepts and objectives covered; (3) four pre-visit activities on carnivorous plants; (4) three on-site activities on the habitat needs of the Venus Flytrap and assessment activities about carnivorous plants; (5) eight post-visit activities on preserving natural areas, designing a model carnivorous plant, and carnivorous plants supplementary diets; (6) a list of 35 related vocabulary words; (7) four appendices containing fact sheets on carnivorous plants, information on caring about endangered species, resources for land use, and a nutrient chart; (8) necessary park and parental permission forms for the visit; and (9) blank pages for taking notes. Contains 16 references and includes a separate educator's guide. (MDH)

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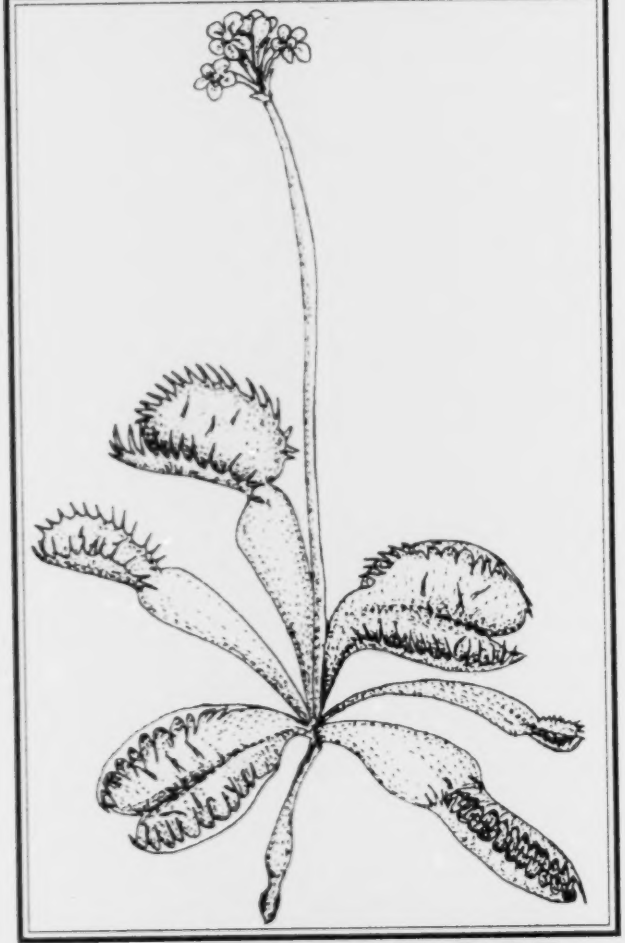

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## Carolina Beach State Park

An Environmental Education Learning Experience

Designed for the Middle Grades



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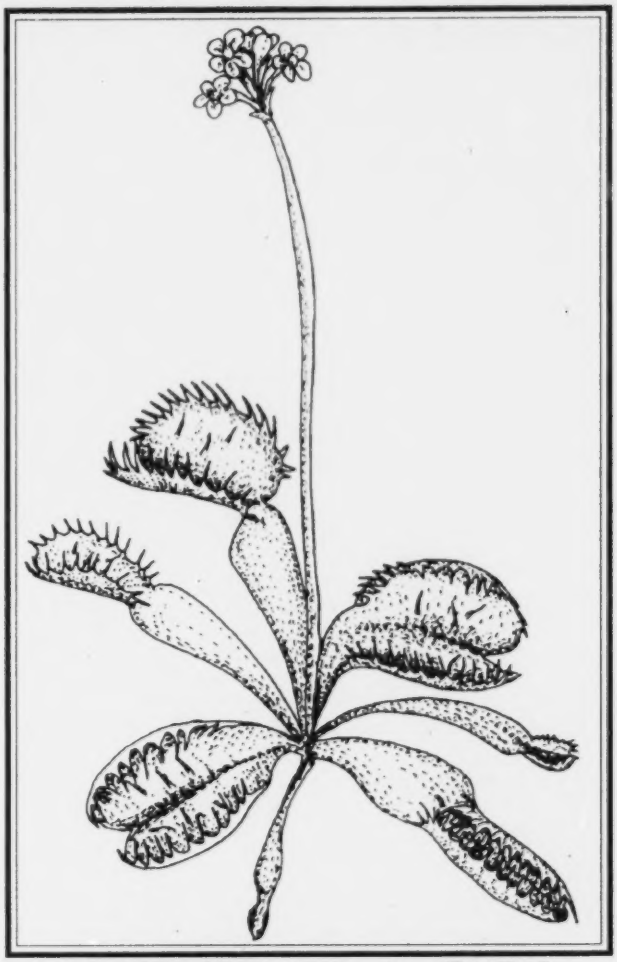

# BITE BACK

## Carolina Beach State Park

An Environmental Education Learning Experience

Designed for the Middle Grades



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This plant, commonly called Venus flytrap,
from the rapidity and force of its movements,
is one of the most wonderful in the world . . .

A moderately large insect, . . .
if it tries to escape between the bars
will be surely pushed back again
into its horrid prison with closing walls,
for the spikes continue to cross more and more
until the edges of the lobes come into contact.

—Charles Darwin, Insectivorous Plants, 1875

This Environmental Education Learning Experience
was developed by

Phoebe Wahab
Lead Interpretation and Education Ranger
Carolina Beach State Park

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# Table of Contents

**1. Introduction**
- Introduction to the North Carolina State Parks System ..... 1.1
- Introduction to Carolina Beach State Park ..... 1.2
- Introduction to the Educator's Activity Packet for Carolina Beach State Park ..... 1.3
- Introduction to How Plants Eat ..... 1.4

**2. Activity Summary** ..... 2.1

**3. Pre-Visit Activities**
- #1 Carnivorous Plants: Believe It or Not! ..... 3.1.1
- #2 Match the Plants and Feeding Methods ..... 3.2.1
- #3 Carnivorous Plant Folklore ..... 3.3.1
- #4 What Will Get Caught? ..... 3.4.1

**4. On-Site Activities**
- #1 The Habitat Needs of the Venus Flytrap ..... 4.1.1
- #2 Jeopardy for Carnivorous Plants ..... 4.2.1
- #3 Touch and Experience: Plants That Bite Back ..... 4.3.1

**5. Post-Visit Activities**
- #1 Build a Better Flytrap ..... 5.1.1
- #2 Preserving Natural Areas: You Too Can Help! ..... 5.2.1
- #3 Island Paradise ..... 5.3.1
- #4 Loss of Habitat = Loss of Plants ..... 5.4.1
- #5 This Pitcher's A Catcher! ..... 5.5.1
- #6 Eat to Compete: Dietary Supplements ..... 5.6.1

**6. Vocabulary** ..... 6.1

**7. Appendices** ..... 7.1.1

**8. References** ..... 8.1

**9. Forms** ..... 9.1

**10. Notes** ..... 10.1

# Introduction to the North Carolina State Parks System

Preserving and protecting North Carolina's natural resources is actually a relatively new idea. The seeds of the conservation movement were planted early in the 20th century when citizens were alerted to the devastation of Mount Mitchell. Logging was destroying a well known landmark - the highest peak east of the Mississippi. As the magnificent forests of this mile-high peak fell to the axe of the lumbermen, alarmed citizens began to voice their opinions. Governor Locke Craig joined them in their efforts to save Mount Mitchell and together they convinced the legislature to pass a bill establishing Mount Mitchell as the first state park.

That was in 1915. The North Carolina State Parks System has now been established for more than three-quarters of a century. What started out as one small plot of public land has grown into 59 properties across the state, including parks, recreation areas, trails, rivers, lakes and **natural areas**. This vast network of land boasts some of the most beautiful scenery in the world and offers endless recreation opportunities. But our state parks system offers much more than scenery and recreation. Our lands and waters contain unique and valuable archaeological, geological and biological resources which are an important part of our natural heritage.

As one of North Carolina's principal conservation agencies, the Division of Parks and Recreation is responsible for the more than 125,000 acres that make up our state parks system. The Division manages these resources for the safe enjoyment of the public, and protects and preserves them as a part of the heritage we will pass on to generations to come. An important component of our stewardship of these lands is education. Through our interpretation and environmental education services, the Division of Parks and Recreation strives to offer enlightening programs which lead to an understanding and appreciation of our natural resources. The goal of our environmental education program is to generate an awareness in all individuals which cultivates responsible stewardship of the earth.

For more information contact: N.C. Division of Parks and Recreation
P.O. Box 27687
Raleigh, N.C. 27611-7687

# Introduction to Carolina Beach State Park

Bordered by the Cape Fear River and the Intracoastal Waterway, Carolina Beach State Park is located 15 miles south of Wilmington off of U.S. 421. The park was established in 1969 in order to preserve the unique **environment** along the intracoastal waterway. A portion of the land was acquired with the first state expenditure for park land since the purchase of Mount Mitchell in 1916.

Numerous recreation facilities and a variety of educational opportunities make a visit to Carolina Beach a rewarding adventure. The natural resources of this unique coastal area open the door to a world of learning and discovery. One of the most outstanding natural features of the park is its diverse plant communities - eight different plant communities are present within this small area. Here, students can learn how **carnivorous** plants attract and trap insects; they can explore the wonders of a marsh; or they can climb Sugarloaf, a 60 foot high sand dune overlooking the Cape Fear River.

For more information contact:

Carolina Beach State Park
P.O. Box 475
Carolina Beach, N.C. 28428
(919) 458-8206 (office)
(919) 458-7770 (marina)

# Introduction to the Educator's Activity Packet for Carolina Beach State Park

The environmental education learning experience, **Plants That Bite Back**, was developed to provide environmental education through a series of hands-on activities geared to Carolina Beach State Park. This educator's activity packet, designed to be implemented in the middle school grades, meets curriculum objectives of the standard course of study established by the North Carolina Department of Public Instruction. It includes three types of activities - 1) pre-visit activities, 2) on-site activities, and 3) post-visit activities. On-site activities will be conducted at the park, while pre-visit and post-visit activities are designed for the classroom **environment**. These activities may be performed independently or in a series to build upon students' newly gained knowledge and experiences.

The environmental education learning experience, **Plants That Bite Back**, will expose students to the following major concepts:

- Plant adaptations
- **Endemic species**
- **Controlled burning**
- Endangered **species**
- Preservation of **natural areas**
- **Resource management**

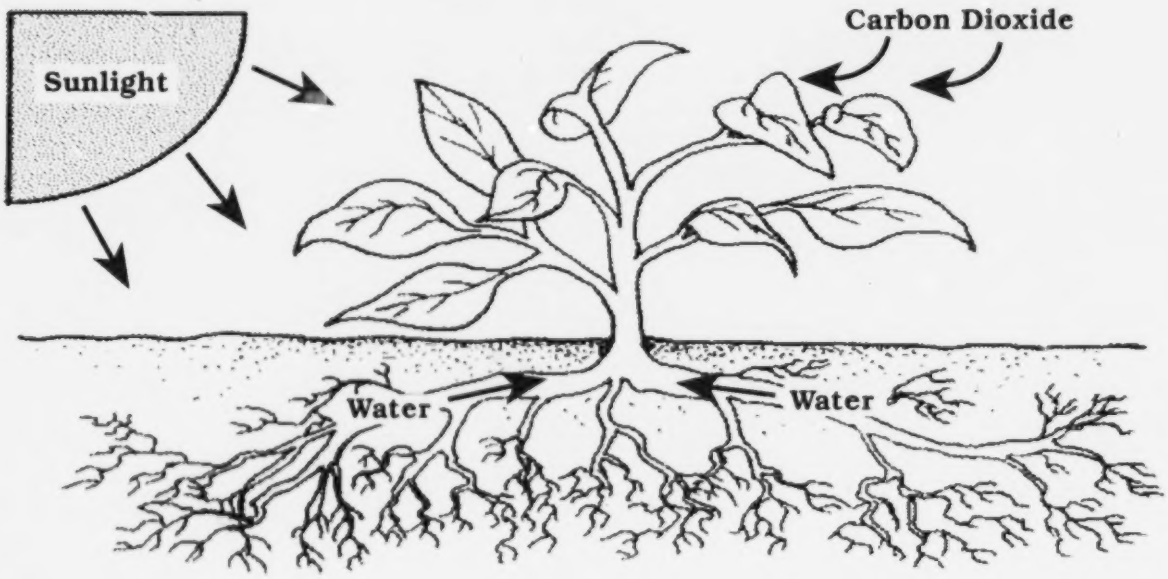
The North Carolina Department of Public Instruction is in the process of revising the curriculum for all subject areas, therefore specific curriculum objectives are not listed. Each activity does include, however, a listing of the curriculum study areas which are used in that activity.

Vocabulary words used throughout this environmental education learning experience appear in bold type. These words and their definitions may be found in the vocabulary list at the back of the activity packet. A list of the reference materials used in developing the activities follows the vocabulary list.

**NOTE:** On-site activities may require hiking which could expose the students to hot, humid conditions and ticks. Accessibility to some of these areas may be difficult for persons with special needs.

# Introduction to How Plants Eat *

Green plants contain **chlorophyll**. **Chlorophyll** uses energy from the sun along with water and carbon dioxide to make the food that plants need in order to grow. This process is called **photosynthesis**. The water and **nutrients** which are necessary to carry on **photosynthesis** are extracted from the soil by the plant's roots.




**Water ($H_2O$) + Carbon Dioxide ($CO_2$)** $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ **Plant Food**

**Carnivorous** plants may be distinguished from other plants by what they eat and the way that they eat it. These plants, like other green plants, carry out **photosynthesis**, but, in addition, they have adapted a special way of supplementing their diet. **Carnivorous** plants usually grow in acidic soil which is **boggy** and often filled with **peat**. In this type of soil, **nutrients**, especially nitrogen and phosphorous, are often unavailable to the plant. **Carnivorous** plants supplement their requirements for nitrogen, phosphorous and other minerals by trapping and digesting insects and other small creatures, thus the name **carnivorous**. These plants can survive without this **nutrient** supplement from animals, but they become less vigorous and are less able to successfully **compete** with the other plants in their **environment**.

** Background information to be read to students prior to beginning activities*

# Activity Summary

The following outline provides a brief summary of each activity, the major concepts introduced and the objectives met by completion of the activity.

## I. Pre-Visit Activities

**#1 Carnivorous Plants, Believe It or Not! (page 3.1.1)**

In an entertaining way the students will learn about the adaptations of carnivorous plants by deciding if the plant described is real or imaginary.

**Major concepts:**

- Plant adaptations.
- Listening and observation skills.

**Objectives:**

- Describe three different ways carnivorous plants have adapted to attract prey.
- Explain three ways carnivorous plants have adapted to trap prey.

**#2 Match Plants and Feeding Methods (page 3.2.1)**

Using a worksheet, the students will be introduced to five carnivorous plants and will be asked to match pictures, methods of attracting prey and methods of trapping prey.

**Major concept:**

- Plant adaptations.

**Objectives:**

- Describe the five carnivorous plants found at Carolina Beach State Park.
- Explain three different ways carnivorous plants have adapted to attract prey.
- Describe three different ways that carnivorous plants have adapted to trap prey.

**#3 Carnivorous Plant Folklore (page 3.3.1)**

Have fun and excite the curiosity of your students by reading and discussing folk stories about carnivorous plants.

**Major concepts:**

- A view of carnivorous plants through folk stories.
- How folklore is used to teach moral lessons, to pass on historical events and to explain mysterious phenomenon.
- Listening skills.

**Objectives:**

- Define folklore.
- List three functions of folklore.

**#4 What Will Get Caught? (page 3.4.1)**

In a fun way the students will determine the most common prey of the Venus flytrap by completing a maze.

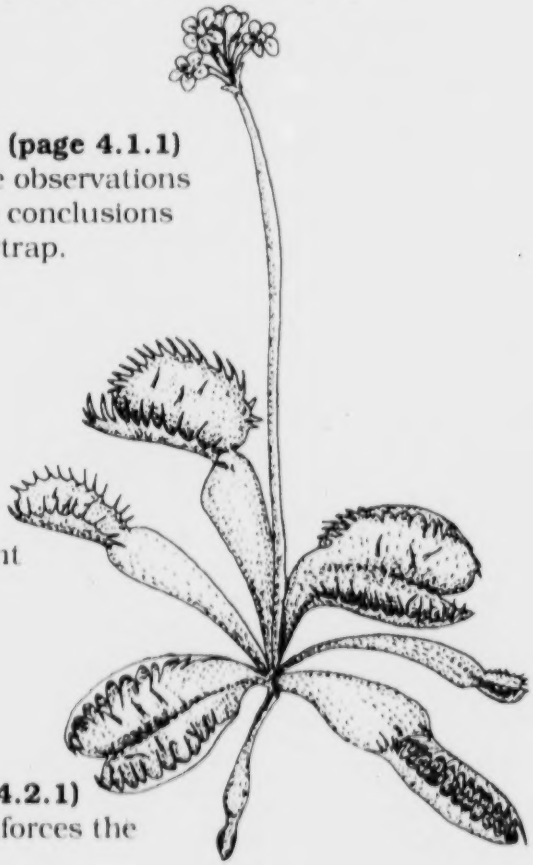
**Major concepts:**

- Plant adaptations of the Venus flytrap.

**Objectives:**

- Determine the most common prey of the Venus flytrap.
- Describe two adaptations of the Venus flytrap for catching its prey.

## II. On Site Activities



**#1 The Habitat Needs of the Venus Flytrap (page 4.1.1)**

Using a data sheet the students will make observations and answer questions which will lead to conclusions about the habitat needs of the Venus flytrap.

**Major Concepts:**

- Plant adaptations.
- Endemic species.
- Controlled burning.
- Resource management.
- Endangered species.
- Observation skills.

**Objectives:**

- Illustrate two ways resource management practices, such as controlled burning, benefit carnivorous plants.
- Draw a Venus flytrap.
- List three ways a species can become endangered.

**#2 Jeopardy For Carnivorous Plants (page 4.2.1)**

Involve the students in a game which reinforces the objectives of previous activities.

**Major concepts:**

- Plant adaptations.
- Endemic species.
- Controlled burning.
- Resource management.
- Endangered species.
- Preservation of natural areas.

**Objectives:**

- Explain three ways that carnivorous plants have adapted to attract prey.
- Discuss three ways carnivorous plants have adapted to trap prey.
- Describe two ways resource management practices, such as controlled burning, benefit carnivorous plants.
- List three ways a species can become endangered.
- Assess the importance of the role of state parks in protecting threatened or endangered species.

**#3 Touch and Experience - Plants That Bite Back (page 4.3.1)**

Using only their sense of touch students will learn about the trapping methods of the five carnivorous plants found at Carolina Beach State Park.

**Major concepts:**

- Plant adaptations.
- Observation skills using sense of touch.

**Objectives:**

- Using terms which recount their tactile experience, students will describe and demonstrate three different ways carnivorous plants trap prey.

## III. Post-Visit Activities

**#1 Build a Better Flytrap (page 5.1.1)**

Students will use common household and school items to design and construct a carnivorous trap. They will explain and assess the adaptations of the trap they have created.

**Major concept:**

- Design and function of a model carnivorous plant.

**Objectives:**

- Create a working model of a carnivorous plant.
- Describe its habitat.
- Explain its attracting and trapping mechanisms.
- Evaluate and predict its chances for survival or extinction.

**#2 Preserving Natural Areas: You Too Can Help! (page 5.2.1)**

The students will develop arguments on land use issues from a range of perspectives.

**Major concepts:**

- Land use planning.
- Preservation of natural areas.
- Rare plants.
- Extinction.

**Objectives:**

- Give examples of land use and preservation in the community.
- Identify three agencies in the community that deal with land use issues.
- Identify three agencies in the community that deal with preservation issues.
- List five reasons why one should care about saving species.

**#3 Island Paradise (page 5.3.1)**

Students will create an imaginary collage of human land use activities around an image of an island. A discussion and evaluation of human impacts on land use will follow.

**Major concepts:**

- Human impacts from land use decisions.
- Responsible human actions and how they affect the environment.
- Alternatives and consequences of human actions.

**Objectives:**

- Discuss and evaluate the effects of three different land use methods on an island.
- Recommend three ways people can change their lifestyles to minimize damaging effects to the environment.

**#4 Loss of Habitat = Loss of Plants (page 5.4.1)**

Using the information gathered in On-Site Activity #1, students will analyze and draw conclusions about loss of habitat in various scenarios.

**Major concepts:**

- Habitat loss.
- Endangered species.

**Objectives:**

- Solve problems concerning the number of carnivorous plants lost due to development, using math skills.
- Infer what loss of habitat may occur in various situations.
- Propose solutions to habitat loss.

**#5 This Pitcher's A Catcher! (page 5.5.1)**

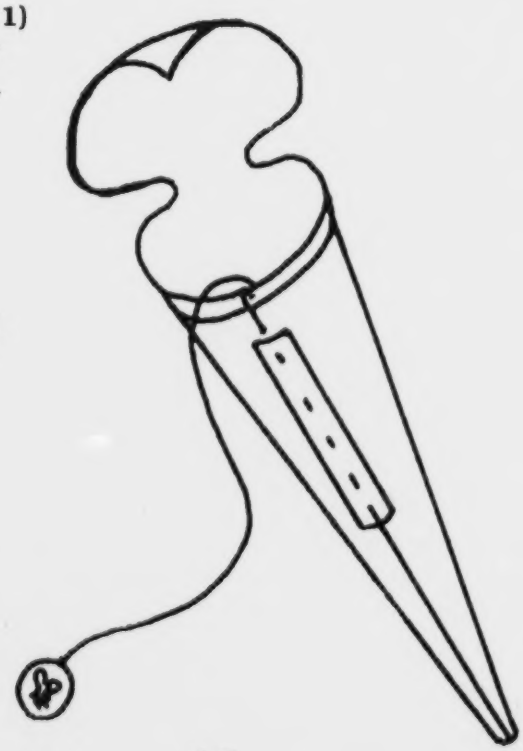
The students will learn about pitcher plants by creating a working model.

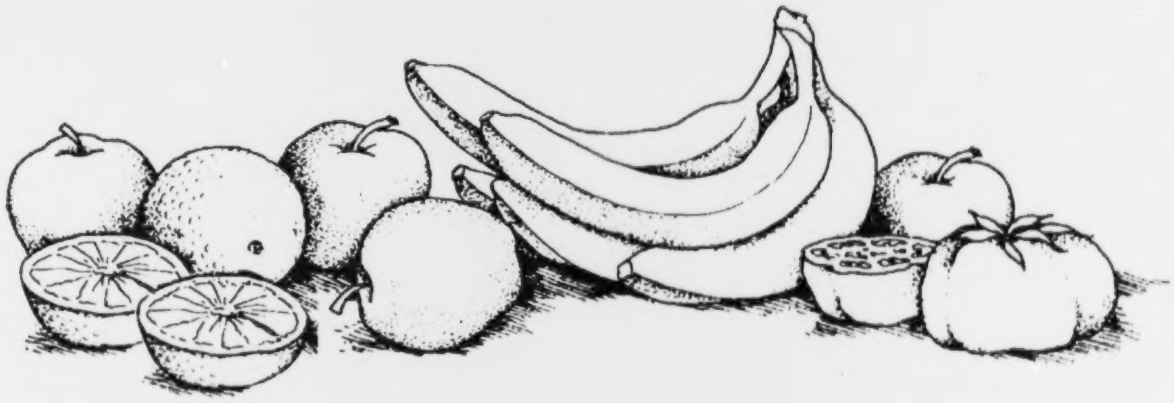
**Major concepts:**

- Design and function of a model carnivorous plant.

**Objectives:**

- Construct a toy pitcher plant that functions like a real plant.
- Describe and evaluate the trapping methods of pitcher plants.





**#6 Eat to Compete: Dietary Supplements (page 5.6.1)**

Students will be given minimum nutritional requirements from foods that grow in this region. Presented with of a number of ways to supplement their diets, just as carnivorous plants do, students compete to choose the supplements that will make their team the most vigorous.

**Major concepts:**

- Nutrition.
- Dietary supplements.

**Objectives:**

- Explain why carnivorous plants supplement their diets.
- Determine which dietary supplements help humans to become more vigorous and which dietary supplements are of little nutritional value. Name three of each.
- Describe under what circumstances it may be necessary to supplement basic nutrients.

# Pre-Visit Activity #1

## Carnivorous Plants: Believe It or Not!

**Major concepts:**

- Plant adaptations.
- Listening and observation skills.

**Objectives:**

- Describe three different ways **carnivorous** plants have adapted to attract **prey**.
- Explain three different ways **carnivorous** plants have adapted to trap **prey**.

**Curriculum objectives met:**

- Grade 6 - Communication Skills: listening and visual comprehension
  Social Studies: evaluate, organize, analyze information, draw conclusions
- Grade 7 - Communication Skills: listening and visual comprehension
  Science: characteristics of plants
  Social Studies: evaluate, organize, and analyze information, draw conclusions
- Grade 8 - Communications Skills: listening and visual comprehension
  Science: characteristics of plants, **adaptation**
  Social Studies: evaluate, organize, and analyze information, draw conclusions

**Special considerations:** Students must listen carefully to information read.
**Location:** classroom
**Group size:** 30 or smaller, class size
**Estimated time:** 20 minutes
**Appropriate season:** any

**Credits:** This activity was adapted with permission from the National Wildlife Federation's *NatureScope*, "Wading Into Wetlands".

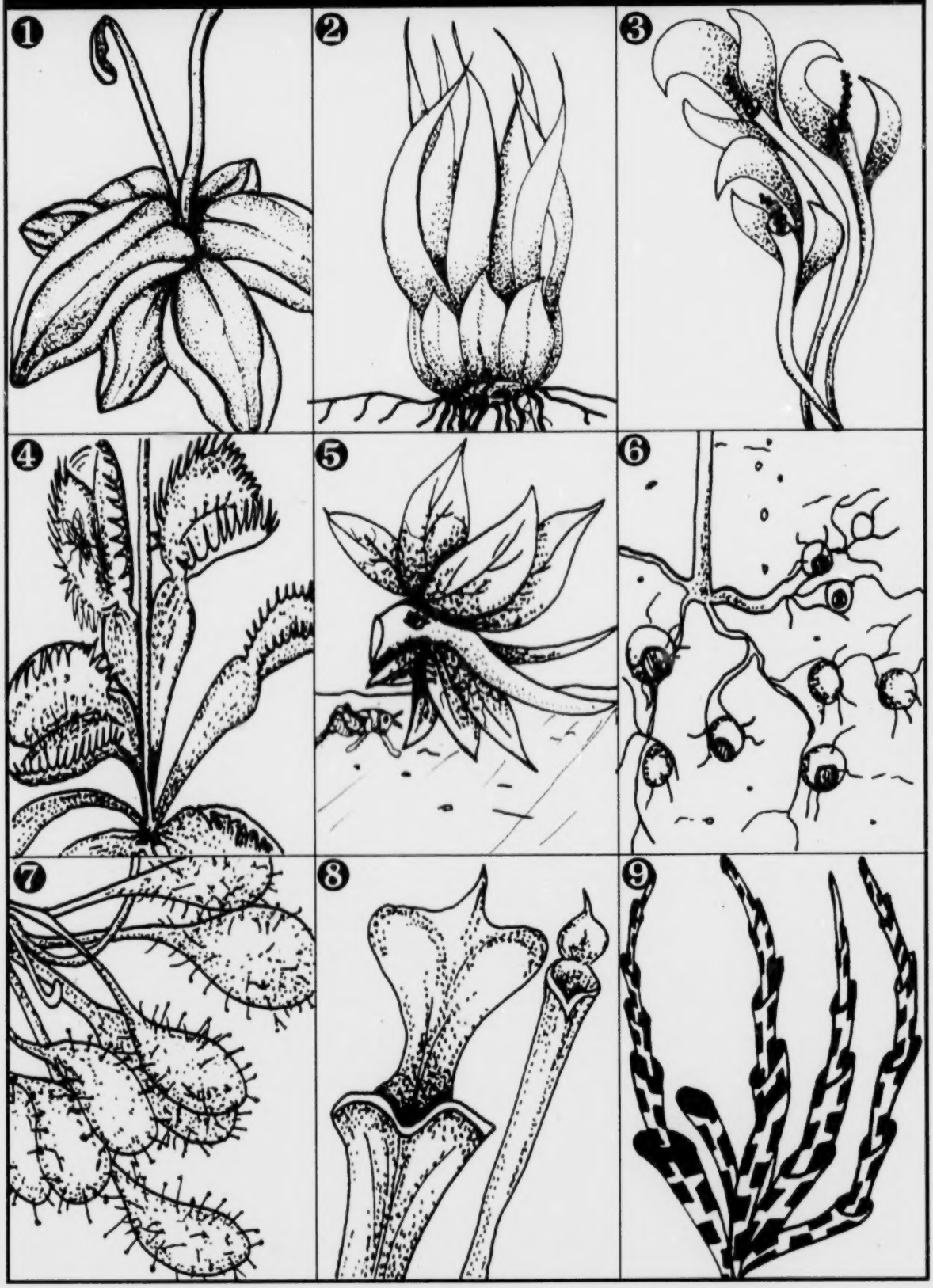
**Materials:** Plant Descriptions (for educator) and a worksheet for each student.

**Educator's information:**

Descriptions of nine **carnivorous** plants follow. Each of these plants is also depicted in a drawing on the worksheet. These **carnivorous** plants may appear to be something out of science fiction, but as unbelievable as it may seem, five of the nine plants described are real **carnivorous** plants which actually grow at Carolina Beach State Park. Four of the plants are imaginary.

Read the nine highlighted plant descriptions to the students while they look at the worksheet. Do not read the names of the plants. Have the students decide which plant drawing was just described. Then have them decide which of the plants described are real plants and which are imaginary. For additional information on the five **carnivorous** plants growing in Carolina Beach State Park refer to the fact sheets in Appendix #1.

# Believe It or Not!



**Plant Descriptions** ( Do Not Read Names Aloud)

**1. Butterwort** (Real)
The yellowish-green leaves of this insect-eating plant glisten in the sunlight as they lay low to the ground. The leaves have a finely pebbled texture and a greasy feel due to the presence of many **glands** which produce an oily, sticky substance. Small **prey** are attracted by the plant's musty smell and become mired down by the sticky secretions on its leaves. The edges of the leaf roll inward, causing the secretions to pool, and form a shallow cup around the **prey**. The **prey** suffocates and is digested in the fluid.

**2. Hummer Plant** (Imaginary)
This low-growing plant prefers to grow in very open areas. The leaves grow tightly together, the bottom fusing into a cup with two small openings. The leaves separate and flare out at the top to become narrow and needle-like. As the wind blows, air is circulated through the small openings causing the narrow leaves inside the cup to move. This movement creates a low, vibrating sound as the stems rub together. This humming sound attracts small crawling insects. Thinking the sound is another insect in distress, they crawl up to the plant to investigate. As they reach the top of the cup the swirling air flow causes them to lose their footing and to be swept into the cup. They fall down into the bottom where **digestive enzymes** absorb their soft body parts into the plant.

**3. Angler Plant** (Imaginary)
A red or pinkish lure on the end of a slender stalk is located in the center of the plant. Light breezes move the lure slightly and make it twist and shimmer in the sunlight. This attracts insects to investigate the enticing bait. When touched, part of the leaf clamps down, pushing the stunned **prey** into a narrow tube containing **digestive enzymes** where soft body parts are absorbed into the plant.

**4. Venus Flytrap** (Real)
Attracted by the brilliant colors of its captor, the **prey** is lured into the trap. Trigger hairs, aroused by the movement of the **prey**, activate the trap which snaps shut in less than a second. The guard hairs along the edge of the trap mesh, snaring the unwary victim and the captive is devoured. Satisfied, the trap reopens in about three days, readying itself for yet another unsuspecting visitor.

**5. Glider Plant** (Imaginary)
A light breeze loosens this plant from its perch and sends it gliding in the wind in search of **prey**. Several leaves are fused together to form wing-like appendages which are able to take advantage of light winds and carry the plant aloft. Any unsuspecting insect in its path is scooped into a widely gaping mouth-like opening from which it can not escape. Upon contact with the ground, the mouth snaps shut sealing the victim's fate. Digestion begins when enzymes are secreted by the plant.

**6. Bladderwort** (Real)
This plant lives in a **boggy** or wet **habitat**. The plant has many balloon-like traps on its branching stems. These buoyant traps suck in unsuspecting **prey**, such as mosquito larvae, when the feather-like triggers on one of the bladders are touched. The **prey** is digested by plant secretions.

**7. Sundew** (Real)
The numerous hair-like **glands** on the red, club-shaped leaves are tipped with a glistening, sticky **mucus**. Unlucky **prey** become stuck in the sticky **glands** of the leaves as they brush against them. The extraordinary digestive system of the plant consumes its struggling **prey** by absorbing it directly into the leaf within a couple of hours.

**8. Pitcher Plant** (Real)
The plant's leaves form a funnel-like opening to a long narrow cylinder containing **digestive enzymes** at the bottom. A portion of the leaf appears to be a lid covering the funnel. The funnel lip contains nectar-producing **glands** which entice insects to investigate the cylinder. Upon entry the insects discover downward pointing hairs and a slippery surface which prevents escape from the trap. The insects slip and fall to the bottom where they are absorbed into the plant.

**9. Checkmate** (Imaginary)
An insect smells sweet nectar coming from **glands** in the stem of a leaf. The insect crawls towards the nectar, continuing further as the nectar becomes more concentrated. The insect finds itself surrounded by the leaf in a pattern of light and dark green. In the sunlight, the lighter parts of the leaf appear to be an open window. As the insect crawls towards the light expecting to exit, it finds that the leaf is solid. The insect crawls to another light part, again finding no exit. As the insect crawls further it finds itself in a one-way maze which ends in a narrow chamber filled with digestive juices. Here the insect drowns and its soft body parts are absorbed by the plant.

# Pre-Visit Activity #2

## Match the Plants and Feeding Methods

**Major concepts:**

- Plant adaptations.

**Objectives:**

- Describe the five **carnivorous** plants found at Carolina Beach State Park.
- Explain three ways that **carnivorous** plants have adapted to attract **prey**.
- Discuss three ways **carnivorous** plants have adapted to trap **prey**.

**Curriculum objectives met:**

- Grade 6 - Communication Skills: reading and vocabulary comprehension, viewing comprehension
  Social Studies: locate and gather needed information, evaluate, organize and analyze information, draw conclusions
- Grade 7 - Communication Skills: reading and vocabulary comprehension, viewing comprehension
  Science: characteristics of plants
  Social Studies: locate and gather needed information, evaluate, organize and analyze information, draw conclusions
- Grade 8 - Communication Skills: reading and vocabulary comprehension, viewing comprehension
  Science: **adaptation**
  Social Studies: locate and gather needed information, evaluate, organize and analyze information, draw conclusions

**Location:** classroom
**Group size:** 30 or less, class size
**Estimated time:** 20 minutes
**Appropriate season:** any

**Materials:** "Match the Plants and Feeding Methods" worksheet and "**Carnivorous** Plants: Attracting and Trapping Methods" fact sheet (one of each per student)

**Background:** General background found in packet introduction

**Educator's information:**

Students will fill in the worksheet by matching the **carnivorous** plants, their methods of attracting and deceiving **prey**, and their methods of trapping and digesting their **prey**. Have them use the fact sheet **Carnivorous** Plants: Attracting and Trapping Methods as a reference.

# Worksheet for Pre-Visit Activity #2

## Match The Plants And Feeding Methods

**Instructions:** Match the **carnivorous** plants, their method of attracting **prey**, and their method of trapping and digesting their **prey**. Enter the number or letter which best describes the plant. Use the fact sheet **Carnivorous** Plants: Attracting and Trapping Methods as a reference.

| Plant | Drawing | Attracting Method | Trapping Method |
|---|---|---|---|
| Butterwort | _____ | _____ | _____ |
| Bladderwort | _____ | _____ | _____ |
| Sundew | _____ | _____ | _____ |
| Venus Flytrap | _____ | _____ | _____ |
| Pitcher Plant | _____ | _____ | _____ |

## Methods of Attracting Prey

**A.** Sparkling drops of clear liquid on red hairs attract the **prey** to the leaf.

**B.** There is no known mechanism for attracting **prey**.

**C.** A musky smell entices insects to the leaf.

**D.** The sweet smell and reddish surface of the leaf's lobes attract the **prey**.

**E.** A sweet nectar and bright colors attract the **prey** which is then enticed by the nectar at the edge of the trap.

## Methods of Trapping and Digesting Prey

**I.** The victim becomes stuck in a sticky substance which oozes from hairs (actually glands on long stalks) on the leaves. The more the victim struggles to escape, the more gooey fluid is secreted. Nearby glands bend over the **prey** holding it tightly. A digestive enzyme secreted by shorter glands in the center of the leaf digests the **prey** in a few hours.

**II.** The unsuspecting victim touches a trigger hair twice and electric impulses cause the trap to close rapidly. As the struggling insect fights to escape, the trap closes completely and **digestive enzymes** are secreted, absorbing the insect.

**III.** Rain water and digestive fluids fill the bottom of the trap. After venturing to the rim of the vessel, the **prey** often goes too far, falling and slipping through a number of obstacles which make escape almost impossible. The **prey** drowns in the fluids and is absorbed.

**IV.** The small balloon-shaped trap is adapted to catch tiny aquatic creatures. A double-sealed airtight door, situated on one end of the trap, opens when the **prey** touches the trigger. The trap sucks in the **prey** and since the door is hinged only one way, there is no escape. The captured **prey** is digested over a period of days.

**V.** Two types of glands are found on the leaves. An oily substance secreted by one of the glands traps the victim and the other gland secretes digestive juices. When the **prey** is caught in the oily liquid, the leaves move slightly inward and curl up to form a shallow bowl where the **prey** is digested and absorbed.

# Fact Sheet for Pre-Visit Activity #2

## Carnivorous Plants: Attracting and Trapping Methods

**Venus flytrap** - The trap attracts its **prey** with its sweet smell and the reddish surface of its lobes. When the **prey** touches a trigger hair twice, the plant reacts with an electrical impulse which closes the trap rapidly. As the insect struggles, the trap closes completely, **digestive enzymes** are secreted, and the insect is digested. Ants are its most common food.

**Bladderwort** - This small plant's traps are adapted to catching tiny aquatic creatures such as mosquito larvae. The traps themselves are oval balloons with double-sealed airtight doors on one end. When the **prey** touches the trigger, the trap door opens and, similar to a vacuum cleaner, it sucks in the **prey**. After the excess water is absorbed by the plant, enzymes digest the **prey**.

**Sundew** - Sparkling drops of clear liquid secreted by red hair-like **glands** attract the **prey**, who becomes stuck in this gluey liquid. As the victim struggles to escape, more sticky fluid is produced. Neighboring **glands** bend around the **prey** to hold it firmly. Shorter **glands** in the center of the leaf then secrete a digestive enzyme which digests the **prey** in a matter of hours.

**Pitcher Plant** - Bright colors and a sweet nectar attract the **prey**. The nectar becomes more concentrated closer to the mouth of the vessel. The trap is a vessel capable of holding liquid, part of which is a digestive fluid. The victim slips and tumbles down an obstacle course which insures its capture.

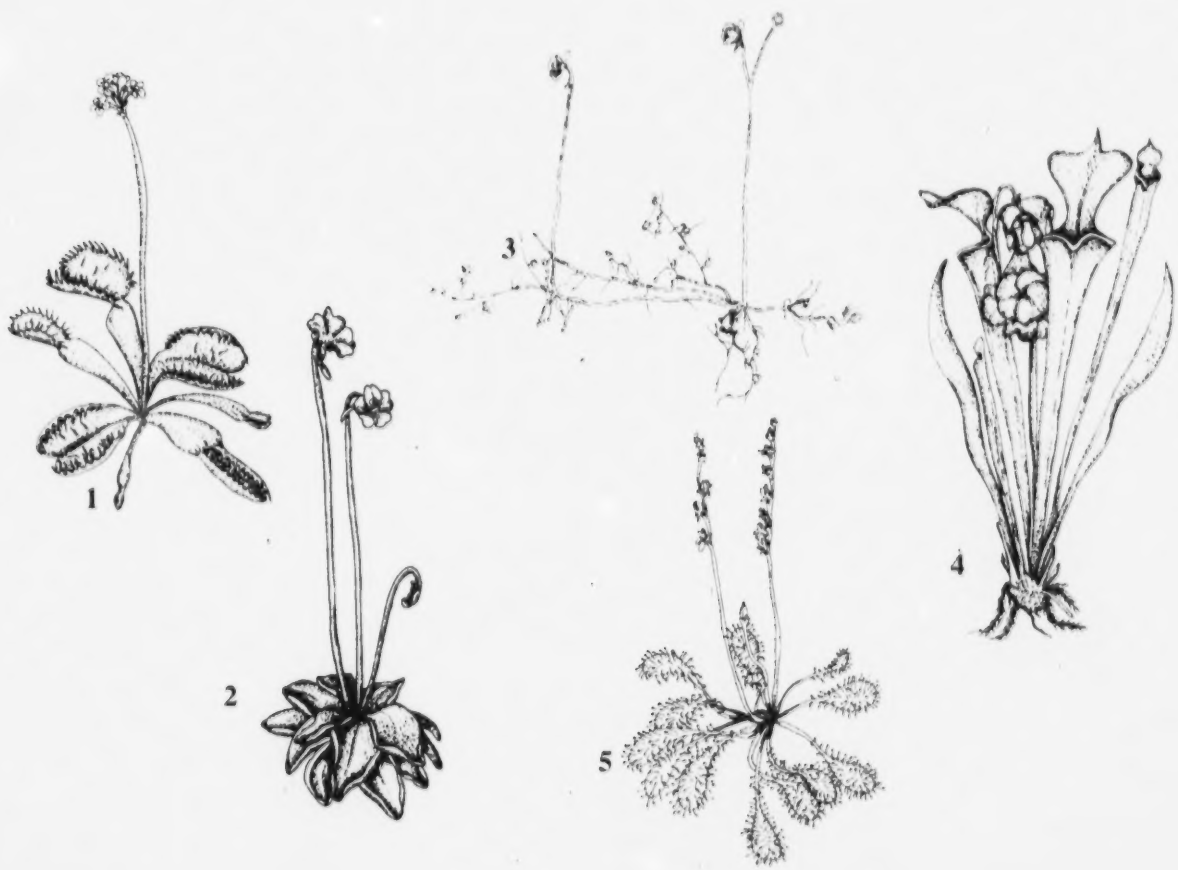
**Butterwort** - A musky smell attracts insects. The leaves have two types of **glands** on them. One secretes an oily substance which traps the victim; the other secretes digestive juices. When the **prey** is caught in the oily liquid the leaves move slightly, rolling upward to form a shallow cup for the digestive fluid.

# Answers for Pre-Visit Activity #2

## Match The Plants And Feeding Methods

**Instructions:** Match the **carnivorous** plants, their method of attracting **prey**, and their method of trapping and digesting their **prey**. Enter the number or letter which best describes the plant. Use the fact sheet **Carnivorous** Plants: Attracting and Trapping Methods as a reference.

| Plant | Drawing | Method of Attracting | Method of Trapping |
|---|---|---|---|
| Butterwort | 2 | C | V. |
| Bladderwort | 3 | B | IV. |
| Sundew | 5 | A | I. |
| Venus Flytrap | 1 | D | II. |
| Pitcher Plant | 4 | E | III. |



# Pre-Visit Activity #3

## Carnivorous Plant Folklore

**Major concepts:**

- A view of **carnivorous** plants through folk stories.
- Uses of **folklore** to teach moral lessons, to pass on historical and cultural events and to explain mysterious phenomenon.
- Listening skills.

**Objectives:**

- Define **folklore**.
- Give three examples of **folklore** and describe three of its functions.

**Curriculum objectives met:**

- Grade 6 - Communication Skills: reading and vocabulary comprehension
  Social Studies: evaluate information
- Grade 7 - Communication Skills: reading and vocabulary comprehension
  Social Studies: evaluate information
- Grade 8 - Communication Skills: reading and vocabulary comprehension
  Social Studies: evaluate information

**Location:** classroom
**Group size:** 30 or smaller, class size
**Estimated time:** 30 minutes
**Appropriate season:** any

**Credits:** Monkey-Trap Tree was taken from *Carnivorous Plants* by Randall Schwartz. Uncle Heber's Venus Plant was taken from "Musings", July 1985. Death Flower was taken from *Myths and Legends of Flowers, Trees, Fruits and Plants* by Charles M. Skinner Philadelphia and London, J.B. Lippincott Co. 1939 page 30. Folk tale, Effort To Protect the Fly-Trap, Margaret Nygard, "Enviro South", Winter 1977.

**Educator's information:**

The mysterious ways of **carnivorous** plants offer a colorful theme for **folklore**. Following is a collection of stories taken from encounters with **carnivorous** plants in far-off lands as well as close to home. Read (or have students read) one or more of these stories. Discuss how folk stories develop, emphasizing the following:

1) Folk stories are often developed to explain functions of the natural world which are not fully understood.
2) **Folklore** is a way of passing historical events down through time.
3) **Folklore** is a way to teach moral lessons.

**Student's information:**

**Folklore** is any of the beliefs, customs and traditions that people pass on from generation to generation. **Folklore** often reflects the attitudes and ideals of a particular society. Oral literature, fairy tales, folk tales, ballads, legends, myths and riddles are all examples of **folklore**. Myths are stories explaining how the world and humanity developed into their present forms. Folk tales are stories that depict how plants, animals and human beings originated and functioned. These stories often convey a moral lesson.

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# Carnivorous Folk Stories

## Monkey-Trap Tree

A recent report is credited to a Brazilian explorer named Mariano da Silva who returned from a expedition that led him into a district of Brazil that borders on Guyana. He had there sought out the settlement to the Yatapu Indians. During his journey he saw a tree which nourishes itself on animals. The tree itself exudes a peculiar odor which attracts its victims, especially monkeys. As soon as they climb the trunk, all is up with them, for quickly they are completely closed in by the leaves, and one neither hears nor sees them again. After about three days the leaves open and let drop to the earth the bones, completely stripped.

## Uncle Heber's Venus Plant

Uncle Heber was about the laziest man what ever growed up in Brunswick County. He was too lazy to wash the dirt and soot off his hide. He was too lazy to get a wife, and his housekeeping just went to no good at all.

The shingles on his house blowed off, cracks came in the walls, and when it rained, more water came inside than stayed out. Uncle Heber stuck it out until the cracks in the walls got so big that the wind came whistling in and blowed the kivers off his bed. That's when Uncle Heber knowed that he had to move somewheres else.

A feller told him about a island up where the Black River and the Cape Fear splits in two. They call it Roan Island, and nobody claims it.

Uncle Heber just put his belongings in a duffle bag, called his dog, and set off for Roan Island up the river.

When he got up yonder he fount a big holler tree what he make into a house. Then he fount out he was on the richest land ever knowed to man. The ground up on Roan Island was made up on silt and black muck what come down river, and all Uncle Heber had to do was poke a stick into the ground, and bederned if it didn't take root and sprout out roots and leaves.

Ther was all kinds of big trees on Roan Island. They was persimmon trees with persimmons big as your head and chinkapins big as your fist. The catfish in the river were as big as alligators. All Uncle Heber had to do was reach out and grab something to eat. Yep, Uncle Heber sure was in high cotton up on Roan Island.

Now Uncle Heber brung along some fine-cut tabacker, and where he spit up on Roan Island, the tabacker juice just naturally took root and growed up into the biggest and strongest tabacker leaves anybody ever seen.

One day, Uncle Heber was laying on his backside fishing and spitting tabacker when he decided he was getting tired of eating catfish all the time. He was thinking how he could get some fresh meat without too much trouble. That's when he got a fool idee.

He remember a perculiar plant back round his home in Brunswick County called Venus Plant, and this plant catches flies and little frogs. He figured in the rich ground up here on Roan Island maybe one of them flytrap'd grow big enough to trap him some game.

After worrying 'bout it for two or three months, he finally got up the gumption to take a trip to his old homestead. When he got up to his old place, he fount the roof done caved in on his old house. The porch just layed like a pile of splintered lightwood. Everything 'round his old house was in ruins 'cept the Venus plants. They just cropped up everywhere, busy catching flies what buzzed 'round where Uncle Heber used to live.

Well, Uncle Heber got one of them Venus plants, and took it to the island, and planted it in a clear space. In no time that plant begin to grow, and if Uncle Heber figgered proper and correct, the Venus plant's going to be as big as a live oak tree. When the Venus plant was six foot high, it catched a rabbit one night. In the morning, Uncle Heber saw the jaws of the trap shut down tight and a rabbit tail sticking out. He thought and thought 'bout how to get that rabbit out. Finally it hit on him and bederned if he didn't rare back and spit some of that strong tabacker juice on the Venus plant. The Venus plant just turned white and shivered all over and open up its jaws and let the rabbit fall to the ground.

Uncle Heber figgered he was the luckiest man anywhere. The Venus plant kept on catching him something to eat 'most ever night, and in a few months, it was big enough to grab a deer or a bear. Uncle Heber had so much game he just didn't bother to fish no more.

Then late one night, Uncle Heber was woke up by a aweful yammering outside. So he looked out of his holler tree, and in the moonlight he sees his dog chasing a big polecat 'round the Venus tree. All of a sudden, the tree reached down and gobbled up the polecat and the dog in one big gulp. Now Uncle Heber he thinks a lot of his old dog. It was his onliest friend, and the only thing he could talk to, and he ruther have 'most anything happen to him, 'cept to lose his dog. So quick as he could, he grabs a big chaw of his tabacker, and he runs out to spit on the Venus tree and cause it to drop his dog. But while he was rared back ready to spit, the Venus tree reaches down and gobbles up Uncle Heber too.

Now that Venus tree, it could take a dog or even a polecat, but it couldn't stummick nothing like Uncle Heber. He's the nastiest critter 'round. When that Venus tree got a taste of Uncle Heber, it went to shaking back and forth and dipping up and down, and big gobs of sticking sap like molasses came oozing out and running down to the ground. Then the Venus tree commenced to coughing and spitting out the dog and the polecat and Uncle Heber. That's when Uncle Heber, first smelt the polecat and when the polecat first smelt Uncle Heber, and the polecat just turned 'round and jumped back in the Venus tree.

Well, the Venus tree never got over having something like Uncle Heber caught down in its jaws. Next day it was all white and wilted and laid out crumpled up all over the ground. The onliest Venus tree knowed to man was dead as Stokey's mule.

After such a close call, Uncle Heber was a changed man. He moved to Wilmington and got him a job in a livery stable, and bederned if he didn't give up chawing tabacker. He said he couldn't stand that sissy tabacker what city-folks chawed.

## Death Flower

It was in 1581 that the valiant explorer, Captain Arkright, learned of an atoll in the South Pacific that one might not visit, save on peril of his life, for this coral ring enclosed a group of islets on one of which the Death Flower grew; hence it was named El Banoor, or Island of Death. This flower was so large that a man might enter it- a cave of color and perfume - but if he did so it was the last of him, for, lulled by its strange fragrance, he reclined on its lower petals and fell into the sleep from which there is no waking. Then, as if to guard his slumber, the flower slowly folded its petals about him. The fragrance increased and burning acid was distilled from its calyx, but of all hurt the victim was unconscious, and so passing into death through splendid dreams, he gave his body to the plant for food.

## Folk tale

There is a story told by local people in the Wilmington area of North Carolina that the Carolina Bays -- those strange lakes, shallow, swampy, **peat**-filled, sandrimmed on the southeast side, elliptical in shape, sometimes overlapping, varying from huge to pebble size and strewn along the coast by the thousands -- were created long ago by a meteor shower.

It is also said that, riding the meteors, came the curious **carnivorous** plant we call the Venus flytrap.

# Pre-Visit Activity #4

## What Will Get Caught?

**Major concept:**

- Plant adaptations of the Venus flytrap.

**Objectives:**

- Determine the most common **prey** of the Venus flytrap.
- Describe two adaptations of the Venus flytrap for catching its **prey**.

**Curriculum objectives met:**

- Grade 6 - Communication Skills: viewing comprehension
- Grade 7 - Communication Skills: viewing comprehension
- Grade 8 - Communication Skills: viewing comprehension

**Location:** classroom
**Group size:** 30 or smaller, class size
**Estimated time:** 5 to 10 minutes
**Appropriate season:** any

**Materials:** "What will get caught?" worksheets

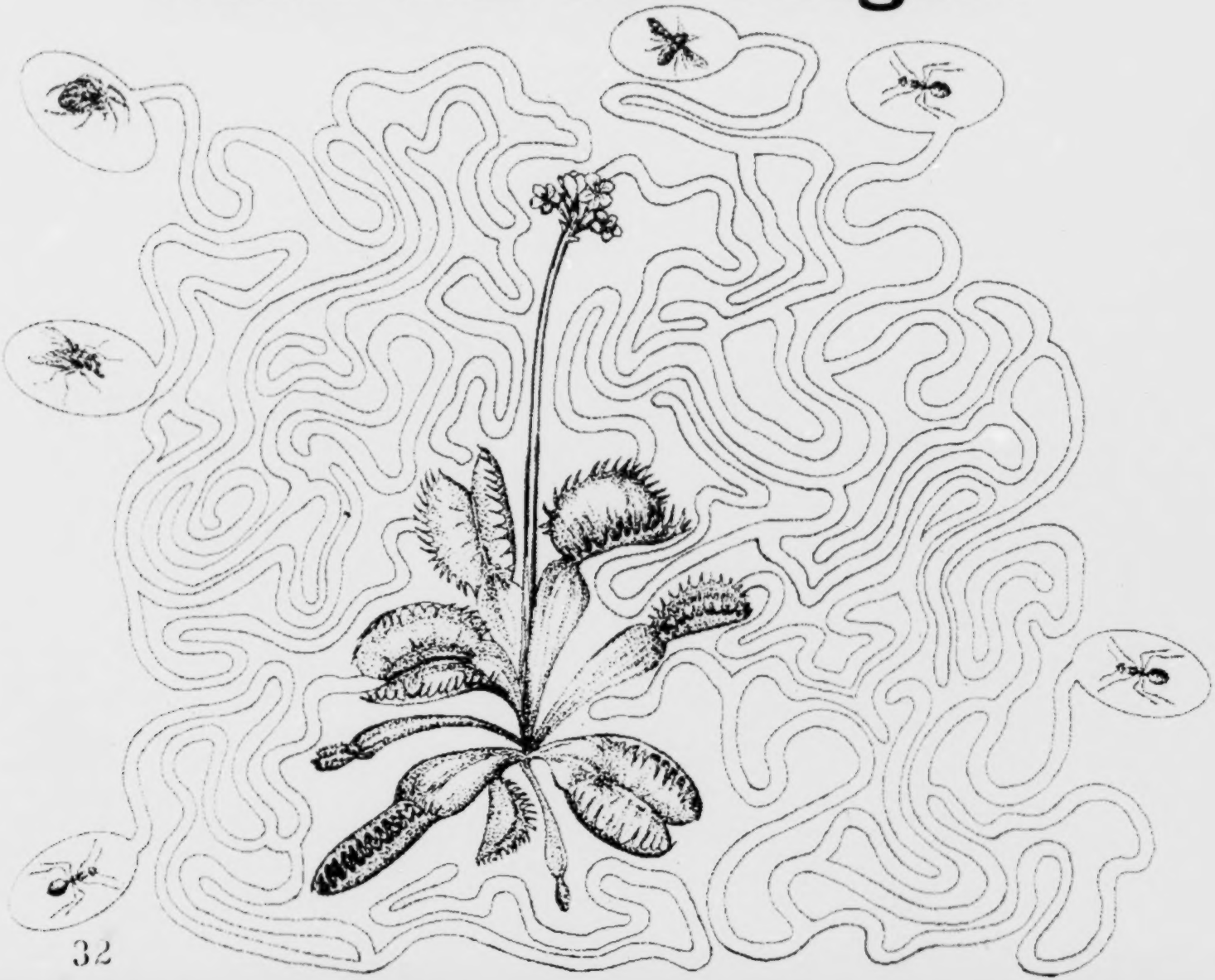
**Educator's information:**

This activity consists of a "What Will Get Caught?" maze. Refer to the Venus flytrap fact sheet in Appendix #1 for further information. After students complete the maze, ask what was caught by the Venus flytrap. Read the following paragraph to the students and discuss which animals were caught, which ones were not, and why.

Venus flytraps capture flies as well as other flying insects. Their most common **prey**, however, are crawling insects such as ants. Flytraps grow in clusters low to the ground and lie in wait for their **prey**. They are well adapted to catching crawling insects since many traps are located close together. The flower is on a tall stalk well away from the traps below. This offers protection to the insect that pollinates the flower.

**Answer to maze:** Three ants and one fly will be caught in the trap. The bee goes only to the flower, avoiding the trap completely. The spider is not caught.

# What Will Get Caught?



# On-Site Activity #1

## The Habitat Needs of the Venus Flytrap

### Major concepts:

- Plant **adaptations**.
- **Endemic species**.
- **Controlled burning**.
- **Resource management**.
- **Endangered species**.
- Observation skills.

### Objectives:

- Illustrate two ways **resource management** practices, such as **controlled burning**, benefit **carnivorous** plants.
- Draw a Venus flytrap.
- List three ways a **species** can become endangered.

### Curriculum objectives met:

- Grade 6 - Communication Skills: study skills using environmental sources, reading, vocabulary and viewing comprehension
  Guidance: competency and skill for interacting with others
  Healthful Living: environmental health
  Mathematics: measurement, probability and statistics
  Science: **ecology**
  Social Studies: locate, gather, organize and analyze information, draw conclusions
- Grade 7 - Communication Skills: study skills using environmental sources, reading, vocabulary and viewing comprehension
  Guidance: being responsible in a group
  Mathematics: probability and statistics
  Science: characteristics of plants, soils
  Social Studies: locate, gather, organize and analyze information, draw conclusions
- Grade 8 - Communication Skills: study skills using environmental sources, reading, vocabulary and viewing comprehension
  Mathematics: measurement, probability and statistics
  Science: **ecology**
  Social Studies: locate, gather, organize and analyze information and draw conclusions

### Special considerations:

This activity requires a short hike along an established boardwalk to reach the activity area. Students with physical disabilities should have no problem getting to the site, but may have difficulty with the activity as it occurs on the ground off the boardwalk. It is recommended that students wear closed shoes and put insect repellent on their feet and ankles to guard against ticks and chiggers. Be prepared for hot, humid weather and dress accordingly.

**Location:** Carolina Beach State Park, Flytrap Loop Trail
**Group size:** 30 or smaller; minimum of 1 leader per 10 students
**Estimated time:** 45 minutes; add 45 minutes if suggested extension is used
**Appropriate season:** late spring to late fall

## Materials:

***Provided by park:*** litmus test kits, clip boards, metric rulers
***Provided by educator:*** "The **Ecology** of **Savannas**" and "The **pH** Scale" (1 of each per student), 2 copies per group of "Habitat Needs of the Venus Flytrap" data sheets, calculators- 1 per leader
***Provided by students:*** pencils, comfortable clothing appropriate for a short hike

## Suggested extension:

Show students other **carnivorous** plants by hiking from the Venus Flytrap Loop Trail to Grass Pond. The hike follows marked trails and will add an additional 45 minutes to the activity. At Grass Pond the students will see **carnivorous** sundews, butterworts and, if in flower, bladderworts. Grass Pond is a shallow oval depression created when the underlying layers of limestone were leached away and the ground collapsed to form a lime sink pond. Many interesting plants grow in this area. At Grass Pond the hike will take the students off the trail and into tall grass. To protect from ticks and chiggers everyone should wear insect repellent.

## Educator's information:

In the Venus flytrap **habitat** the students will be asked to make observations, answer questions and to record this information on the data sheets. Park staff will mark off plots along the Flytrap Loop Trail. One plot will be in an area recently burned by **controlled burning** and another will be in an unburned area. Since Venus flytraps are sun-loving and unable to **compete** with shrubs, few or no flytraps grow in the unburned plots. In the burned areas where the flytraps obtain desired sunlight and other **habitat** needs, they grow in abundance. The students should work in small groups of three or four with one student recording the data. The groups of students will change plots so that each group will have the opportunity to make observations at an unburned and a burned plot and to plot their results for each plot. The leader will assist with the calculations for question #6 using a calculator. Upon completion of this exercise the students will gather and a spokesperson for each group will describe their findings.

Have the students read the background information on the "**Ecology** of **Savannas**," and "The **pH** Scale." Discuss these topics as a class prior to the park visit. Emphasize to the students that the Venus flytrap has particular **habitat** needs such as moist sandy soil and a lot of sunlight. **Controlled burning** and regular mowing are two ways to manage the shrub growth and provide the **habitat** that flytraps desire. Since Venus flytraps are an **endemic species**, only growing in a 60 mile radius of Wilmington N.C., ask the students to consider what the future holds for the plant since the area around Wilmington is developing very rapidly and the plant has very specific **habitat** needs.

## Student's information:

The only place in the world that the Venus flytrap grows naturally is within a 60 mile radius of Wilmington, N.C. This means it is an **endemic species**. It is **native** to this area and grows naturally only in this region.

## The Ecology of Savannas and Controlled Burning

**Ecology** refers to the interrelationship between living beings and their surroundings. The **ecology** of **savannas** is therefore the relationships between the plants and animals that live in a **savanna** - their relationships with the soil, the water, and the air, and their relationships with natural phenomena, such as wildfires, floods, and hurricanes.

An important part of the **ecology** of a **savanna** is fire. Fire helps keep the **savanna** open by limiting the growth of shrubs and trees. It opens up the understory and allows a rich array of **wildflowers** and grasses to quickly resprout from their underground roots and to thrive in the abundant sunlight and **nutrients** released from the ash of burned trees and shrubs.

Before European settlers came to this country, **savannas** were burned periodically due to lightning strikes and fires set by Native Americans. With European settlement of this area, all fires were suppressed and extinguished as soon as possible. In recent years, scientists have found that **savannas** were filling in with trees and shrubs and all of the beautiful **wildflowers** and grasses were disappearing. They have discovered that by setting controlled fires which mimic natural fires, the **savannas** can be restored and the beautiful **wildflowers** and grasses can be saved.

Carolina Beach State Park has a **controlled burning** program to manage the **savannas** in the park. The **savanna** areas are broken into sections of about 1/3 acre and a **firebreak** is mowed and raked around each area. These preparations prevent the fire from spreading into other areas and help to keep the fire under control. These areas are burned approximately every two years when conditions, such as moisture and wind are favorable, and when adequate personnel are available. Because of this **resource management** program in the **savannas**, the plant and animal communities are healthier and more diverse. One plant of particular interest to us, the Venus flytrap, thrives on the **controlled burning** program, since it loves the sunny open wet areas left after a burn. This wildflower, the other **carnivorous** plants, and many other showy plants grow in abundance and can easily be seen in the spring after a **controlled burn**.

## The pH Scale

The term **pH** means (p)otential of (H)ydrogen. Scientists use the **pH** scale to define degrees of acidity. The scale is represented by numbers from 1 to 14. At one end of the scale, a **pH** of 1 is extremely acidic; whereas at the other end of the scale, a **pH** of 14 is extremely non-acidic or basic. A **pH** of 7 is neutral, neither acidic nor basic. Pure water has a neutral **pH**.

**pH** of 2.25

**pH** of 4

**pH** of 5.4

**pH** of 6.5

**pH** of 7.5

Soils that have a **pH** close to neutral are considered to be "rich" because many minerals and **nutrients** are readily available. Acidic soils, on the other hand, are often called "poor" soils because the minerals tend to "leach" or wash out of them easily. Thus, the **pH** of soils is an important factor effecting which plants can thrive in a given **environment**. Plants that grow well in neutral or basic soils include redbuds, black walnuts, and cattails. Plants that grow readily in acidic soils include **native** azaleas and blueberries.

Scientists use a variety of tools to measure **pH**. One simple tool is litmus paper. When litmus paper is dipped in water or a soil solution, it changes color. That color is compared to a spectrum of colors on a color scale. Each color on the color scale is correlated to a known **pH**. When the matching color is found, the **pH** can be determined from the scale.

**Acidic ➡ bluish color on litmus** **Basic ➡ reddish color on litmus**

**pH Scale**

**1** _____ **7** _____ **14**

**acidic** **neutral** **basic**

**Instructions: ***

This activity focuses on the **habitat** of the Venus flytrap and other **carnivorous** plants. In this exercise, you will observe the **habitat**, the Venus flytrap **populations** and the effects of **resource management** practices, such as **controlled burning**, which are used in the preservation of the **habitat**. Since the Venus flytrap is **endemic** to this area, you will be asked to assess how factors, such as the current loss of **habitat** due to development, the lack of **controlled burning**, and **poaching**, affect the future outlook for the plant.

Sample plots have been marked off along the Venus Flytrap Loop Trail. We will divide into groups of 3 or 4. Each numbered group will make a series of observations in two types of plots. One plot will be in an area that has recently been **control-burned** and one will be in an area which has not been burned for several years. Adult leaders will help with the litmus test of the soil in question #3.

After we have completed that part of the activity, we will gather as a class and one student from each group will describe the plots they observed. As a class, we will then do the following:

1. Using the combined results of all groups, compare the number of **carnivorous** plants in the recently burned plots and the unburned plots and indicate these results on a graph.
2. Compare the two graphs and draw conclusions about where **carnivorous** plants like to live.
3. Determine the percentage/ratio of plants in burned areas to plants in unburned areas. Is there a relationship between them?

**While you are working on this project, remember that all plants and animals in state parks and recreation areas are protected. Do not disturb the plants by picking them or attempting to close the traps on the Venus flytraps.**

***To be read at the park***

## Data Sheet for On-Site Activity #1

# The Habitat Needs of the Venus Flytrap

**Plot #_____**

**Check type plot:** ☐ Unburned ☐ Burned

**1. What types of plants grow here? Are they:**

**Shrubs:** Woody plants that usually branch from the base with several main stems, not usually from a single trunk.

**Herbs:** Plants without woody stems which wither away to the ground after each growing season.

**Vines:** Plants with long, thin stems which grow along the ground or climb other plants for support.

**Grasses:** Plants with long slender leaves which are often rolled inward.

**Circle the plant type(s) which describes your plot.**

**a) shrubs** **b) grasses** **c) vines** **d) herbs**

**2. How would you describe the soil in your plot:** **a) sandy** **b) not sandy**

Sandy soils are lighter in color, you can see the individual grains and there is little or no organic matter, such as broken up stems and leaves.

**3. Litmus paper and other materials are provided to test the acidity of the soil in your plot.**

**Record your findings** _____

**Is the soil:** **a) acidic** **b) neutral** **c) basic**

**4. What kinds of carnivorous plants are in your plot?**

_____

_____

_____

_____

**5. How many carnivorous plants are in your plot?**

Plant: _____ Number: _____
Plant: _____ Number: _____
Plant: _____ Number: _____
Plant: _____ Number: _____

**6. Determine the average number of traps on the carnivorous plants in your plot.** (Total # of traps ÷ Total # of plants = Average # of traps per plant)

Total # of traps _____ ÷ Total # of plants _____

Average # of traps per plant _____

**7. Using the metric system, measure your plot.** _____ x _____

**8. If your plot is shrubby would a low growing plant such as a Venus flytrap receive:**

a) little sunlight b) a lot of sunlight

**If your plot is grassy would a low growing plant such as a Venus flytrap receive:**

a) little sunlight b) a lot of sunlight

**9. Are there any carnivorous plants with flowers or seeds in your plot?**

☐ Yes ☐ No

#_____ With Flowers #_____ With Seed Pods

**10. Are there any animals or signs of animals in your plot?** ☐ Yes ☐ No

**What types of animals are they?** (Circle all appropriate.)

a) Beetles b) Ants c) Wasps d) Dragonflies

e) Caterpillars f) Spiders g) Other _____

**What signs have been left behind?**_____

_____

_____

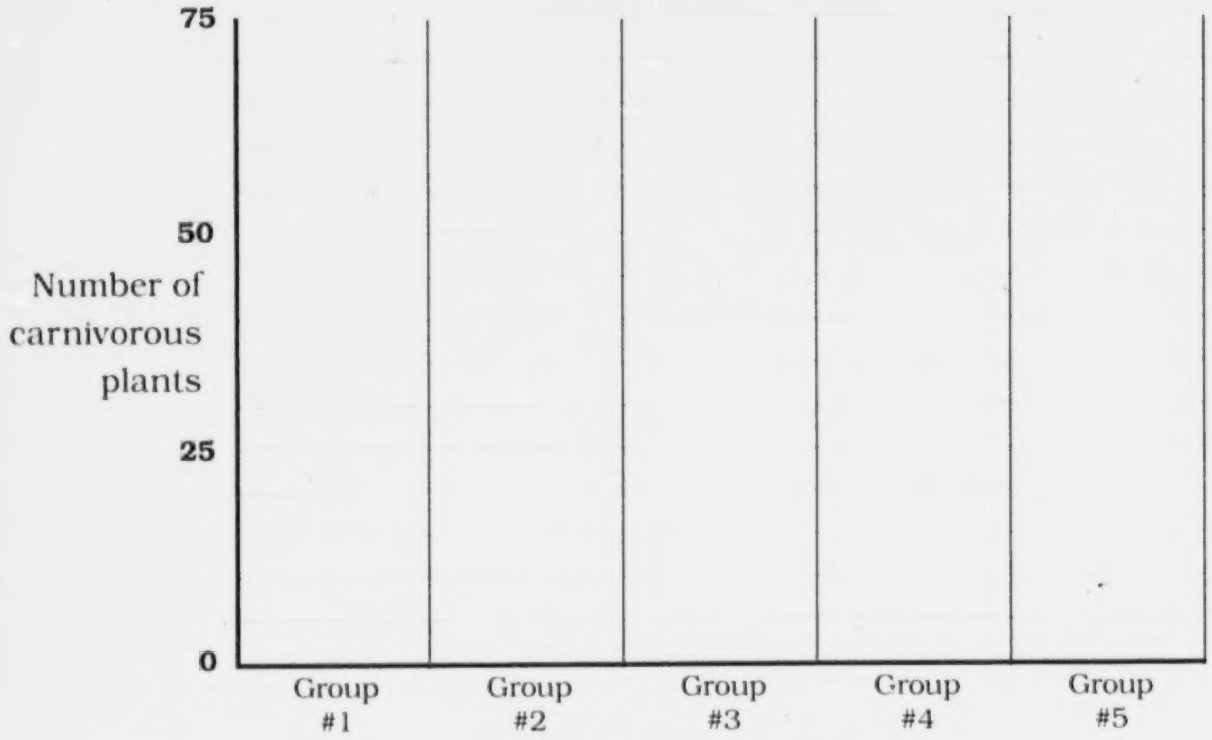
**11. Draw a picture of each type of carnivorous plant in your plot.**

**12. Describe the habitat of the plot you just sampled by reviewing your answers and other data in questions 1 through 8.** Include the following information in your description:

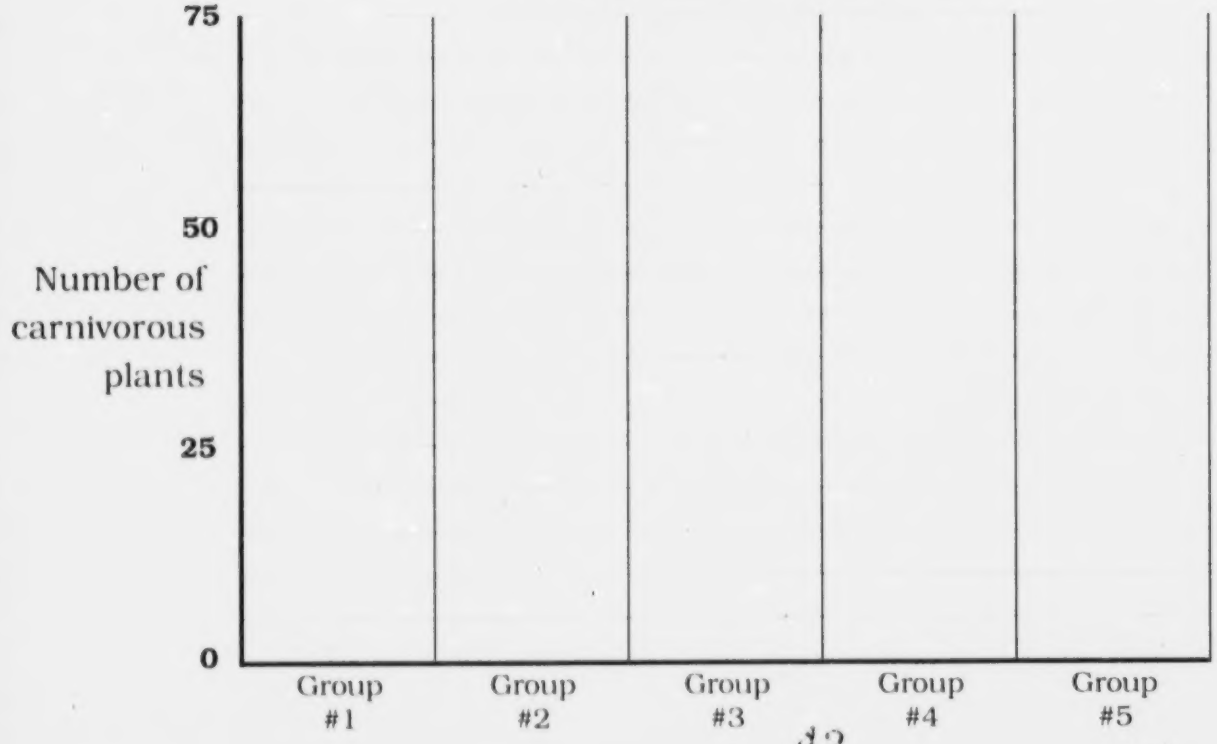
- Type of plants: Shrubs, vines, herbs, grasses
- Type of soil: sandy or not sandy
- **pH** of soil: acidic, neutral, basic
- Amount of sunlight received by the low growing Venus flytrap: little sunlight, a lot of sunlight
- Number of **carnivorous** plants, average # of traps per plant, flowers, seed pods
- Animals present in plot
- **Carnivorous** plants present in plot, size of plot

**13. What is different about the plot where you found the most carnivorous plants as compared to the other plot?**

# BURNED PLOT




# UNBURNED PLOT



# Answer Sheet for On-Site Activity #1

## The Habitat Needs of the Venus Flytrap

**Plot #_____**

**Check type plot:** ☐ Unburned ☒ Burned

**1. What types of plants grow here?**
**Are they:**

**Shrubs:** Woody plants that usually branch from the base with several main stems, not usually from a single trunk.

**Herbs:** Plants without woody stems which wither away to the ground after each growing season.

**Vines:** Plants with long, thin stems which grow along the ground or climb other plants for support.

**Grasses:** Plants with long slender leaves which are often rolled inward.

**Circle the plant type(s) which describes your plot.**

**(a) shrubs** **(b) grasses** **c) vines** **(d) herbs**

**2. How would you describe the soil in your plot:** **(a) sandy** **b) not sandy**

Sandy soils are lighter in color, you can see the individual grains and there is little or no organic matter, such as broken up stems and leaves.

**3. Litmus paper and other materials are provided to test the acidity of the soil in your plot.**

**Record your findings** _____

**Is the soil:** **(a) acidic** **b) neutral** **c) basic**

**4. What kinds of carnivorous plants are in your plot?**

Venus flytraps

**5. How many carnivorous plants are in your plot?**

| | | | |
|---|---|---|---|
| Plant: | Venus flytraps | Number: | 20 to 50+ |
| Plant: | | Number: | |
| Plant: | | Number: | |
| Plant: | | Number: | |

**6. Determine the average number of traps on the carnivorous plants in your plot.** (Total # of traps ÷ Total # of plants = Average # of traps per plant)

Total # of traps _____ ÷ Total # of plants _____

Average # of traps per plant _____

**7. Using the metric system, measure your plot.** **1 meter x 1 meter**

**8. If your plot is shrubby would a low growing plant such as a Venus flytrap receive:**

(a) little sunlight b) a lot of sunlight

**If your plot is grassy would a low growing plant such as a Venus flytrap receive:**

a) little sunlight (b) a lot of sunlight

**9. Are there any carnivorous plants with flowers or seeds in your plot?**

☐ Yes ☐ No

#_____ With Flowers #_____ With Seed Pods

**10. Are there any animals or signs of animals in your plot?** ☒ Yes ☐ No

**What types of animals are they?** (Circle all appropriate.)

**a) Beetles b) Ants c) Wasps d) Dragonflies**

**e) Caterpillars f) Spiders g) Other** _____

**What signs have been left behind?**_____

_____

_____

**11. Draw a picture of each type of carnivorous plant in your plot.**

**12. Describe the habitat of the plot you just sampled by reviewing your answers and other data in questions 1 through 8.** Include the following information in your description:

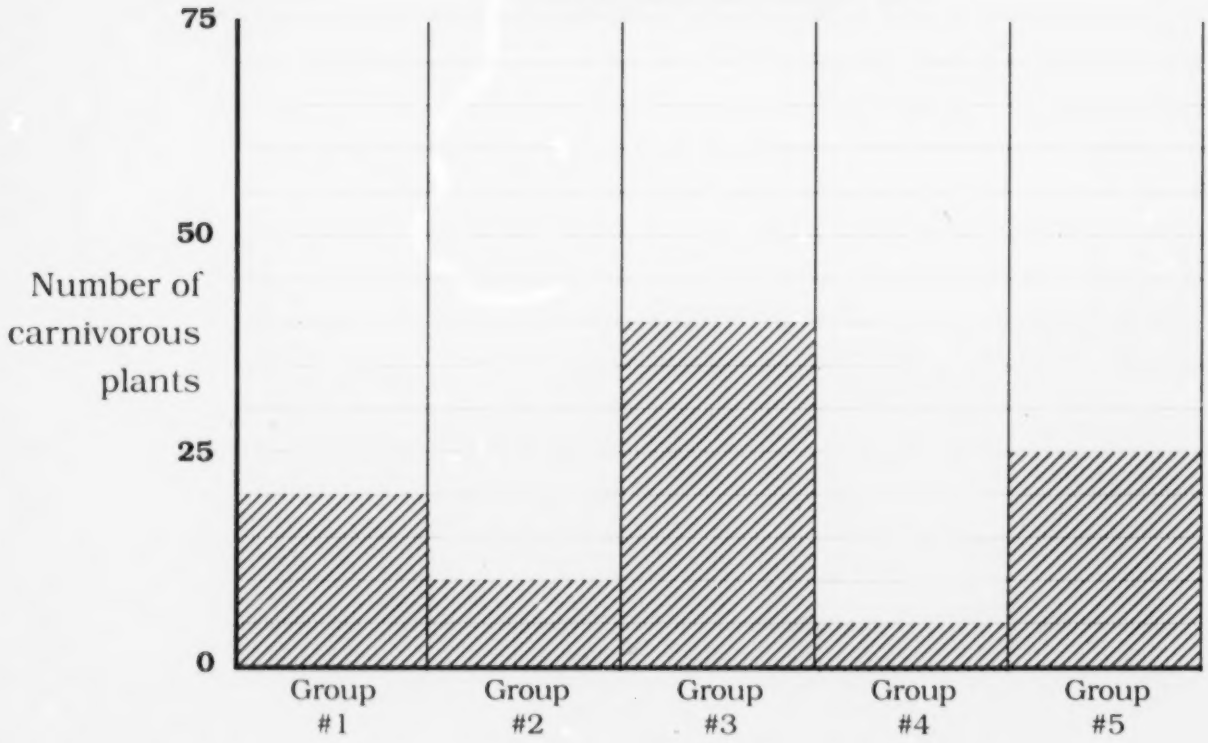
- Type of plants: Shrubs, vines, herbs, grasses
- Type of soil: sandy or not sandy
- **pH** of soil: acidic, neutral, basic
- Amount of sunlight received by the low growing Venus flytrap: little sunlight, a lot of sunlight
- Number of **carnivorous** plants, average # of traps per plant, flowers, seed pods
- Animals present in plot
- **Carnivorous** plants present in plot, size of plot

**The habitat for the Venus flytrap has lots of grasses and herbs with some low growing shrubs. The habitat has acidic sandy soil. We found (_____) Venus flytraps in our 1 x 1 meter plot. (_____) had flowers. Since there were no trees in our plot, the Venus flytraps were in full sun. We noted signs of caterpillars, spiders, and 1 deer hoof print.**

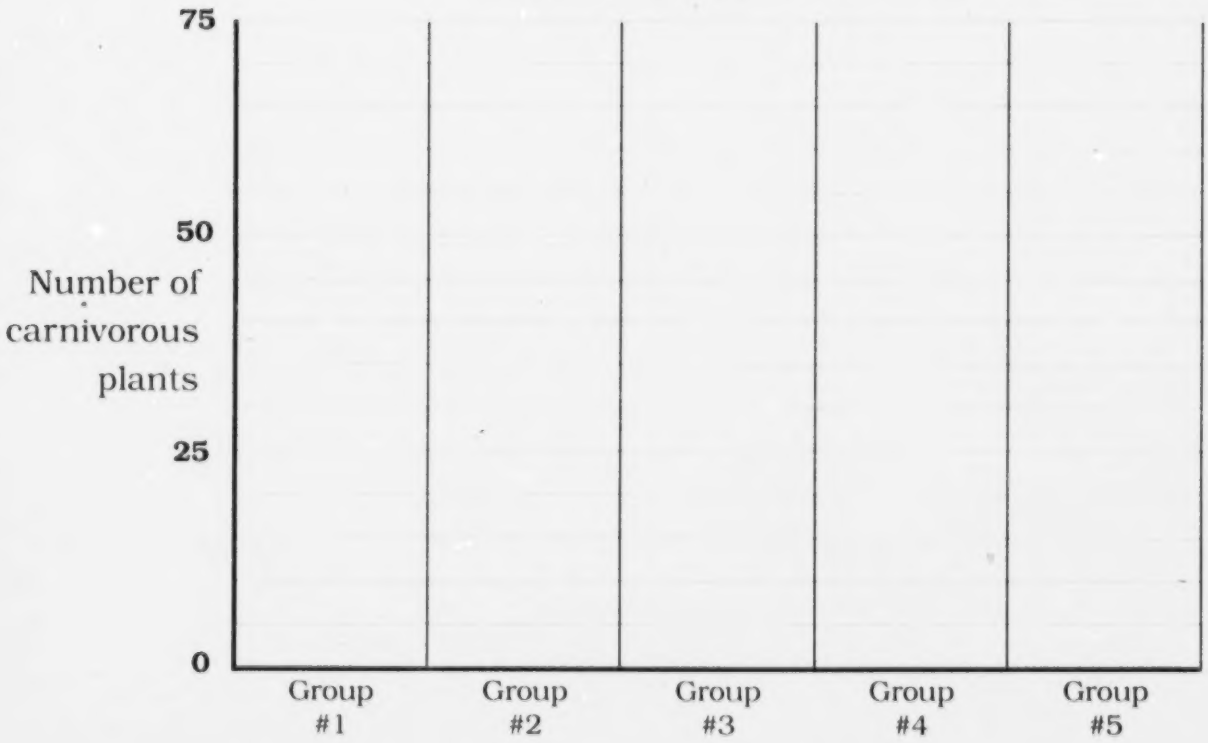
**13. What is different about the plot where you found the most carnivorous plants as compared to the other plot?**

**The plot is grassy with some low growing shrubs. The shrubs are not very dense. Here the Venus flytraps receive more sunlight.**

## BURNED PLOT




## UNBURNED PLOT



# Answer Sheet for On-Site Activity #1

## The Habitat Needs of the Venus Flytrap

**Plot #**_____

**Check type plot:** [X] Unburned [ ] Burned

**1. What types of plants grow here?**
**Are they:**

**Shrubs:** Woody plants that usually branch from the base with several main stems, not usually from a single trunk.

**Herbs:** Plants without woody stems which wither away to the ground after each growing season.

**Vines:** Plants with long, thin stems which grow along the ground or climb other plants for support.

**Grasses:** Plants with long slender leaves which are often rolled inward.

**Circle the plant type(s) which describes your plot.**

**(a) shrubs** **b) grasses** **(c) vines** **d) herbs**

**2. How would you describe the soil in your plot:** **a) sandy** **(b) not sandy**

Sandy soils are lighter in color, you can see the individual grains and there is little or no organic matter, such as broken up stems and leaves.

**3. Litmus paper and other materials are provided to test the acidity of the soil in your plot.**

**Record your findings** _____

**Is the soil:** **(a) acidic** **b) neutral** **c) basic**

**4. What kinds of carnivorous plants are in your plot?**

None

**5. How many carnivorous plants are in your plot?**

Plant: None Number: 0
Plant: _____ Number: _____
Plant: _____ Number: _____
Plant: _____ Number: _____

**6. Determine the average number of traps on the carnivorous plants in your plot.** (Total # of traps ÷ Total # of plants = Average # of traps per plant)

Total # of traps **0** ÷ Total # of plants **0**

Average # of traps per plant **0**

**7. Using the metric system, measure your plot.** **1 meter** x **1 meter**

**8. If your plot is shrubby would a low growing plant such as a Venus flytrap receive:**

(a) little sunlight b) a lot of sunlight

**If your plot is grassy would a low growing plant such as a Venus flytrap receive:**

a) little sunlight (b) a lot of sunlight

**9. Are there any carnivorous plants with flowers or seeds in your plot?**

☐ Yes ☒ No

# **0** With Flowers # **0** With Seed Pods

**10. Are there any animals or signs of animals in your plot?** ☒ Yes ☐ No

**What types of animals are they?** (Circle all appropriate.)

**a) Beetles b) Ants c) Wasps d) Dragonflies**

**e) Caterpillars f) Spiders g) Other** _____

**What signs have been left behind?** _____

_____

_____

**11. Draw a picture of each type of carnivorous plant in your plot.**

**12. Describe the habitat of the plot you just sampled by reviewing your answers and other data in questions 1 through 8.** Include the following information in your description:

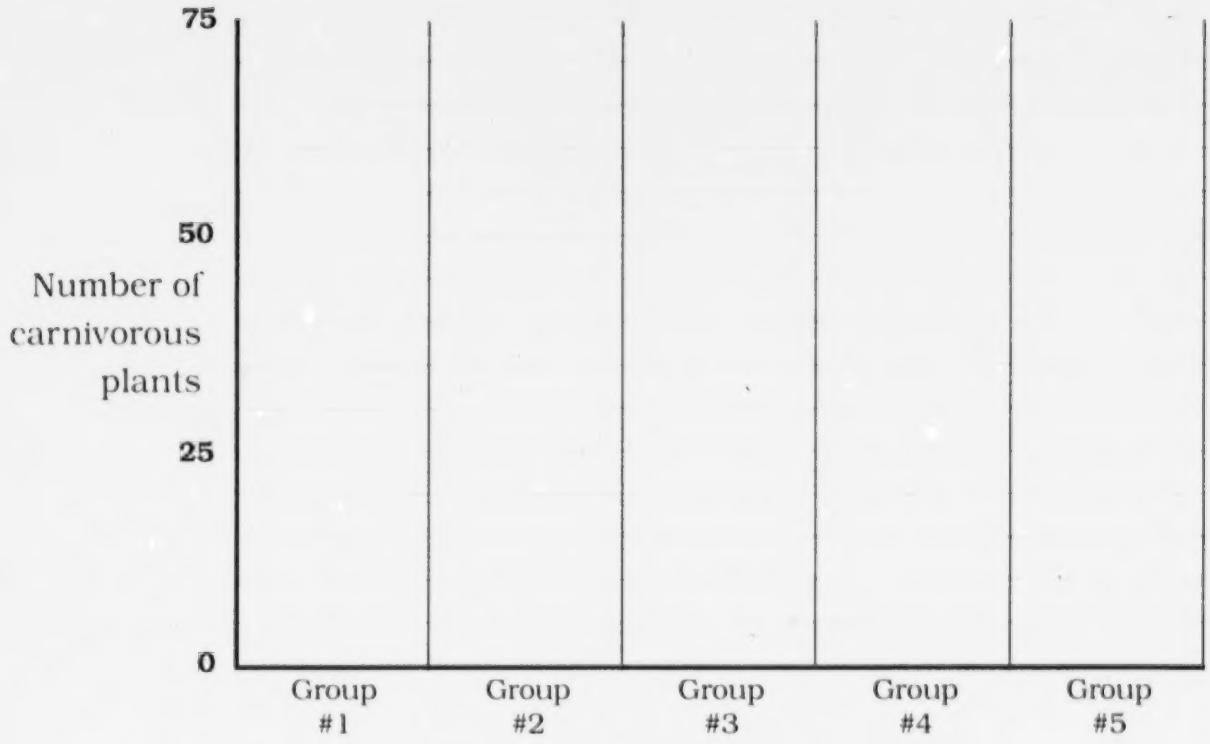
- Type of plants: Shrubs, vines, herbs, grasses
- Type of soil: sandy or not sandy
- **pH** of soil: acidic, neutral, basic
- Amount of sunlight received by the low growing Venus flytrap: little sunlight, a lot of sunlight
- Number of **carnivorous** plants, average # of traps per plant, flowers, seed pods
- Animals present in plot
- **Carnivorous** plants present in plot, size of plot

**The habitat of this plot is pretty shrubby and has vines. The soil is less sandy, yet is still acidic. There are no carnivorous plants in this plot and very little sunlight reaches the low growing plants here.**

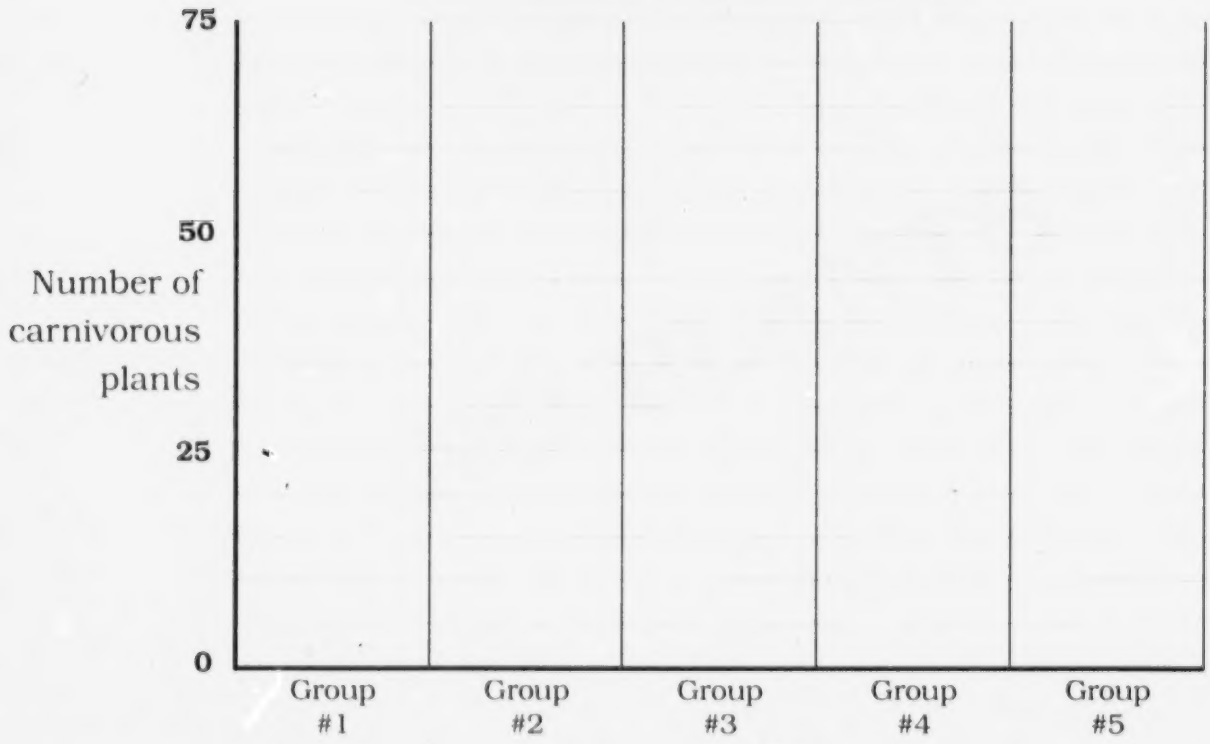
**13. What is different about the plot where you found the most carnivorous plants as compared to the other plot?**

**The plot with the most carnivorous plants has few, low growing shrubs which are not very dense. Because of this, the Venus flytraps do well there.**

# BURNED PLOT




# UNBURNED PLOT



# On-Site Activity # 2

## Jeopardy for Carnivorous Plants

### Major Concepts:

- Plant **adaptations**
- **Endemic species**
- **Controlled burning**
- **Resource management**
- **Endangered species**
- Preservation of **natural areas**

### Objectives:

- List three ways that **carnivorous** plants have adapted to attract **prey**.
- Describe three ways **carnivorous** plants have adapted to trap **prey**.
- Describe two ways that **resource management** practices, such as **controlled burning**, benefit **carnivorous** plants.
- List three ways a **species** can become endangered.
- Assess the importance of the role of state parks in protecting threatened or **endangered species**.

### Curriculum objectives met:

- Grade 6 - Communication Skills: speaking techniques, reading, vocabulary, and viewing comprehension
  Guidance: competency and skill for interacting with others
- Grade 7 - Communication Skills: speaking techniques, reading, vocabulary, and viewing comprehension
  Guidance: being responsible in a group
  Science: characteristics of plants
- Grade 8 - Communication Skills: speaking techniques, reading, vocabulary, and viewing comprehension
  Science: **adaptation**

**Location:** Carolina Beach State Park
**Group size:** 30 or smaller, minimum of one leader per 10 students
**Estimated time:** 30 minutes
**Appropriate season:** any (weather permitting)

**Materials:** Jeopardy board game provided by park

### Educator's information:

The purpose of this activity is to provide a fun way for students to express what they have learned about **carnivorous** plant **ecology** and the importance of Carolina Beach State Park. The format is based on the television game show Jeopardy.

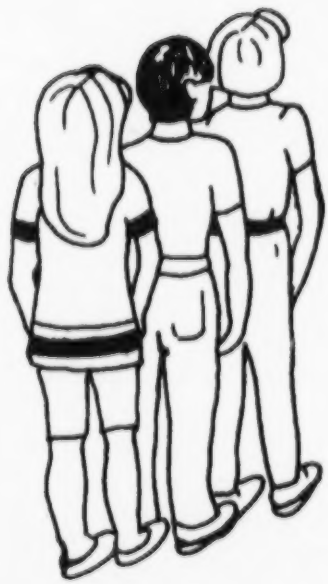
**Instructions:**

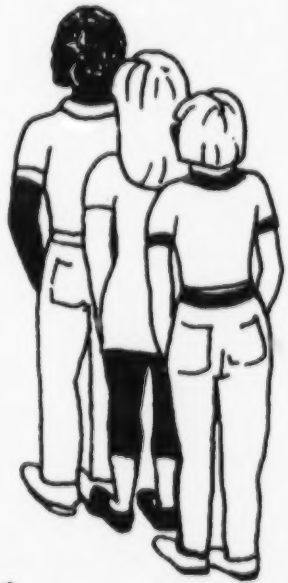
Divide the class into three groups, each group will be a team. Have each group stand in a line facing the Jeopardy game board. The first person in each line is the first contestant. Select one of the three contestants to pick the first number amount and column to be revealed (the amounts do not have to be selected in any particular order, for example the first answer uncovered could be in the middle column under 300 points). After the amount and column are selected, uncover the answer and read it aloud.

The first of the three contestants to raise his/her hand gets a chance to correctly ask the question. It is helpful to have one leader read the "answers" while another leader watches to see which hand is raised first. The correct response must be in the form of a question. If a person correctly answers by asking "what is ____?" his/her team receives the point value on the cover card. The person that correctly "asks" the question gets to select the next amount and column to be revealed. The three contestants from round one then go to the back of their respective team's line. The winning contestant keeps the point card until the end of the game. The three new students, now at the front of the line, are the next contestants for their teams.

After all columns have been uncovered, each team adds their point value cards to determine who has the most points. If there are any prizes or privileges to be awarded, that is done at this time.

| Jeopardy For Carnivorous Plants | | |
|---|---|---|
| PLANTS | HOW THEY CATCH THEIR PREY | FUN FACTS |
| 100 | 100 | 100 |
| 200 | 200 | 200 |
| 300 | 300 | 300 |
| 400 | 400 | 400 |
| 500 | 500 | 500 |





# Jeopardy For Carnivorous Plants

| PLANTS | HOW THEY CATCH THEIR PREY | FUN FACTS |
|---|---|---|
| 100 | 100 | 100 |
| 200 | 200 | 200 |
| 300 | 300 | 300 |
| 400 | 400 | 400 |
| 500 | 500 | 500 |

# Jeopardy For Carnivorous Plants

| PLANTS | HOW THEY CATCH THEIR PREY | FUN FACTS |
|---|---|---|
| | Attracts prey with a musky odor and traps it in a sticky, mucus-like substance. | Things, such as lightning, fire and stormy weather, that help maintain open habitats. |
| | The trap closes when the trigger hairs are touched, quickly sucking in the prey. | The only species in its genus. |
| | When the insect touches part of the plant twice, the trap closes. | Burns and kills larger vegetation that would eventually crowd out the carnivorous plants. |
| | The trap is a slippery hollow tube lined with hairs that point downward and form a barrier against escape. | Poaching, lack of protection, development and lack of controlled burning. |
| | The leaf surface is covered with tiny stalks tipped with a clear sticky liquid which attracts and then traps prey. | A protected place where rare and unusual plants and animals are able to thrive for generations to come. |

# Jeopardy For Carnivorous Plants

| PLANTS | HOW THEY CATCH THEIR PREY | FUN FACTS |
|---|---|---|
| What is a Venus flytrap? | What is a butterwort? | What are natural management tools? |
| What is a pitcher plant? | What is a bladderwort? | What is the Venus flytrap? |
| What is a butterwort? | What is a Venus flytrap? | What is fire or controlled burning? |
| What is a sundew? | What is a pitcher plant? | What are threats to Venus flytraps and other rare plants? |
| What is a bladderwort? | What is a sundew? | What is Carolina Beach State Park? |

# On-Site Activity #3

## Touch and Experience: Plants That Bite Back

**Major concepts:**

- Plant **adaptations**.
- Observation skills using sense of touch.

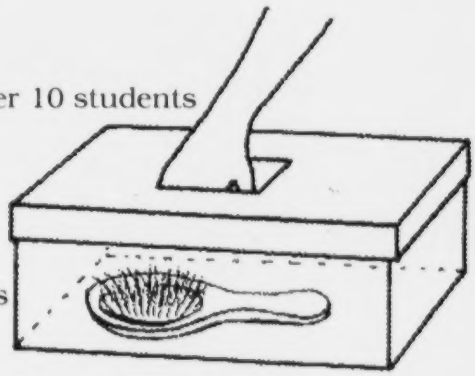
**Objective:**

- Using terms which recount their tactile experience, students will describe and demonstrate three ways that different **carnivorous** plants trap **prey**.

**Curriculum objectives met:**

- Grade 6 - Communication Skills: reading and vocabulary comprehension
  Social Studies: organize and analyze information, draw conclusions
- Grade 7 - Communication Skills: reading, vocabulary and viewing comprehension
  Science: characteristics of plants
  Social Studies: organize and analyze information, draw conclusions
- Grade 8 - Communication Skills: reading and vocabulary comprehension
  Social Studies: organize and analyze information, draw conclusions
  Science: **adaptation**

**Location:** Carolina Beach State Park
**Group size:** 30 or smaller, minimum of 1 leader per 10 students
**Estimated time:** 30 minutes
**Appropriate season:** any (weather permitting)



**Materials:**
***Provided by park:*** Five Touch and Experience boxes and hand-washing materials
***Provided by educator:*** copies of the instructions and the "Touch and Experience" worksheet (one of each per student)

## Educator's information:

This activity stimulates the students' sense of touch as they reach into five boxes and "Touch and Experience" the contents without looking at them. In each box is a common item that represents the trapping method of one of the five **carnivorous** plants that grow in Carolina Beach State Park.

After "experiencing" each box students will complete a worksheet which asks such questions as, "How can that object trap an insect?" If, for example, the item is a hairbrush with widely spaced bristles coated with honey, representing the sundew, most students will comment, "it's sticky and an insect could get stuck in it." Prior to beginning, have the students read the fact sheets in Appendix #1. They will rely upon this information to identify which of the five **carnivorous** plants the objects in each box represent.

Upon completion of the worksheet, as a class, discuss each box and the plant the objects represent. Ask for volunteers to demonstrate the trapping method. After determining which plant it is, open the box and examine the objects.

**The items in each box are as follows:**

1) A jar lid coated with paraffin and a thin layer of petroleum jelly represents a butterwort. The petroleum jelly has the sticky, greasy feeling the **prey** would encounter as it becomes mired in the leaf's secretions.

2) Mouse traps (unarmed) simulate the rapidly closing Venus flytrap as the modified leaf closes around the victim.

3) The squeezing and releasing of a bulb syringe simulates the vacuum-like suction of the bladderwort trapping its **prey**.

4) A hairbrush with bristles coated in honey simulates the glands of the sundew leaf prepared for unsuspecting **prey**.

5) A partially filled cup of water represents a pitcher plant catching insects with its obstacle course ending in a pool of digestive liquids.

**Instructions:**

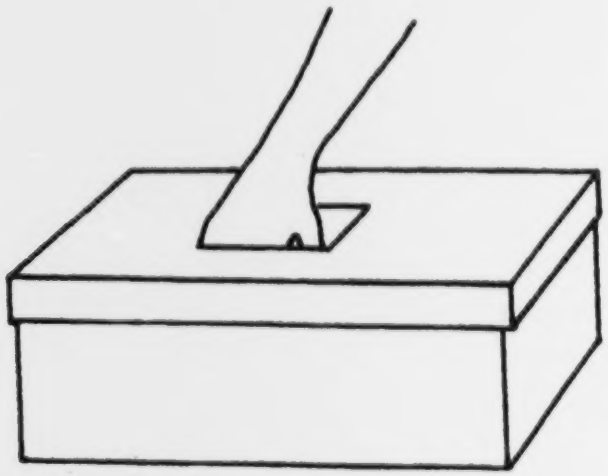
**DANGER! PLANTS THAT BITE BACK.** Death awaits unwary insects and small creatures. The five "Touch and Experience" boxes each contain objects which represent the trapping mechanism of one of the five **carnivorous plants** that grow in Carolina Beach State Park. Reach into the boxes without looking first. Touch and feel the contents of the box. **Answer the following questions for each box on the worksheet.**

1) How could the objects in this box trap unwary insects?

2) Which plant does the contents of this box represent?

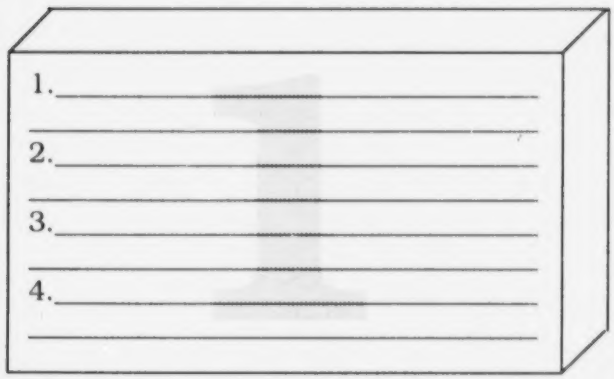
3) How did the trapping mechanism work? (i.e., sticky, suction, etc.)

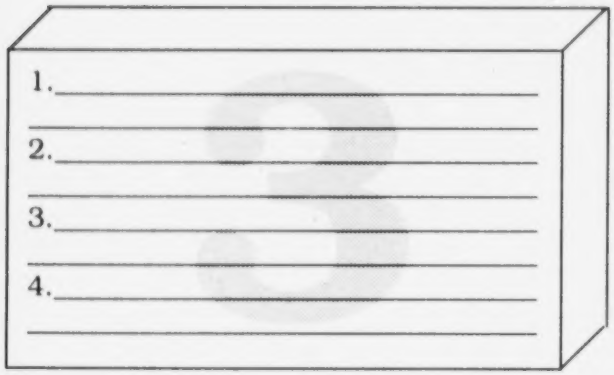
4) Now that you have been trapped, how effective do you think this plant's trapping mechanism is?

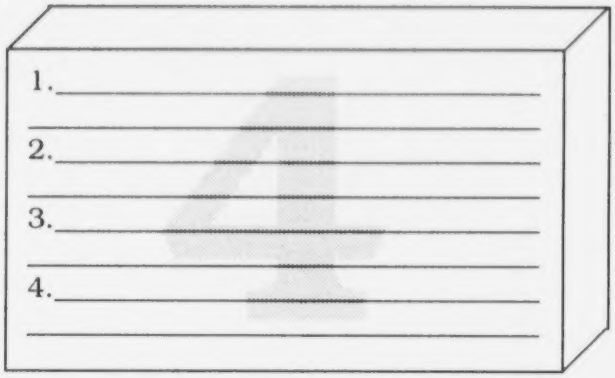


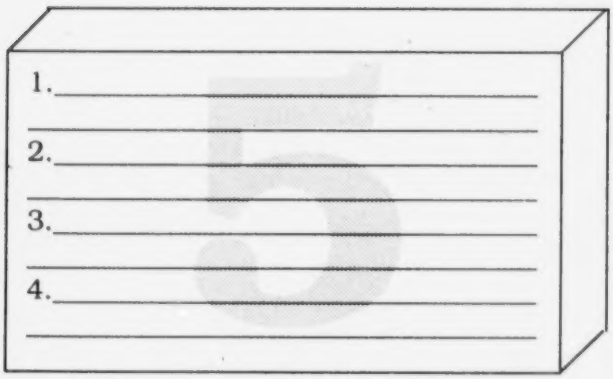
# Worksheet for On-Site Activity #3

**Touch and Experience: Plants That Bite Back**
**Instructions:** Answer the questions on the instruction sheet in each box.





# Post-Visit Activity #1

## Build a Better Flytrap

**Major concept:**

- Design and function of a model **carnivorous** plant.

**Objectives:**

- Create a working model of a **carnivorous** plant.
- Describe its **habitat**.
- Explain its attraction and trapping mechanisms.
- Evaluate and predict its chances for **survival** or **extinction**.

**Curriculum objectives met:**

- Grade 6 - Visual Arts: develop positive attitudes, understand the role creativity plays in art and producing art
  Communication Skills: listening, speaking and reading comprehension
  Guidance: demonstrate skills for interacting with others
  Social Studies: identify problems, gather, organize and analyze information, draw conclusions
- Grade 7 - Visual Arts: develop positive attitudes, understand the role creativity plays in art and producing art
  Communication Skills: listening, speaking and reading comprehension
  Guidance: demonstrate being responsible in a group
  Science: characteristics of plants
  Social Studies: identify problems, gather, organize and analyze information, draw conclusions
- Grade 8 - Visual Arts: develop positive attitudes, understand the role creativity plays in art and producing art
  Communication Skills: listening, speaking and reading comprehension
  Science: **adaptation**
  Social Studies: identify problems, gather, organize and analyze information and draw conclusions

**Location:** classroom
**Group size:** 30 to 50, class size
**Estimated time:** 30-45 minutes
**Appropriate season:** any

**Materials:** An assortment of items such as tape, springs (from discarded retractable ball point pens), construction paper, glue, paper clips, rubber bands, staplers, scissors, velcro, pipe cleaners, cardboard, markers, crayons, paper, bottles, wire, shells, etc.

## Educator's information:

For centuries, the ingenuity and problem solving abilities of men and women have resulted in many life and time saving inventions. The ingenuity and imagination of your students will be challenged in this activity which asks them to "Build a Better Flytrap." Collect an assortment of materials. Break students into groups of three or four and have them construct a trap using the materials provided. Ask them to name the trap and answer the questions in the instructions about how the trap functions. Have each group present their trap to the class. This activity is an excellent follow-up for On-Site Activity #3.

## Instructions: *(To be read to students)*

During your visit to Carolina Beach State Park, you had the chance to see some **carnivorous** plants and to visit their **habitat**. Now that you have come face-to-face with these fascinating plants and have had the opportunity to experience their trapping mechanisms for yourself, you have a better understanding and appreciation of the uniqueness of these valuable **species**. In this exercise, you will use your newly acquired knowledge to design and construct your own **carnivorous** plant. Be ingenious. Use your imaginations. The more colorful, the better. What is the **habitat** of your plant? What (or maybe even who) would you like to see trapped? Your **carnivorous** plant may trap the animal(s) of your choice. Remember to incorporate methods of attracting **prey** into your design.

**After your models are complete, a spokesperson from each group will answer the following questions for the class.**

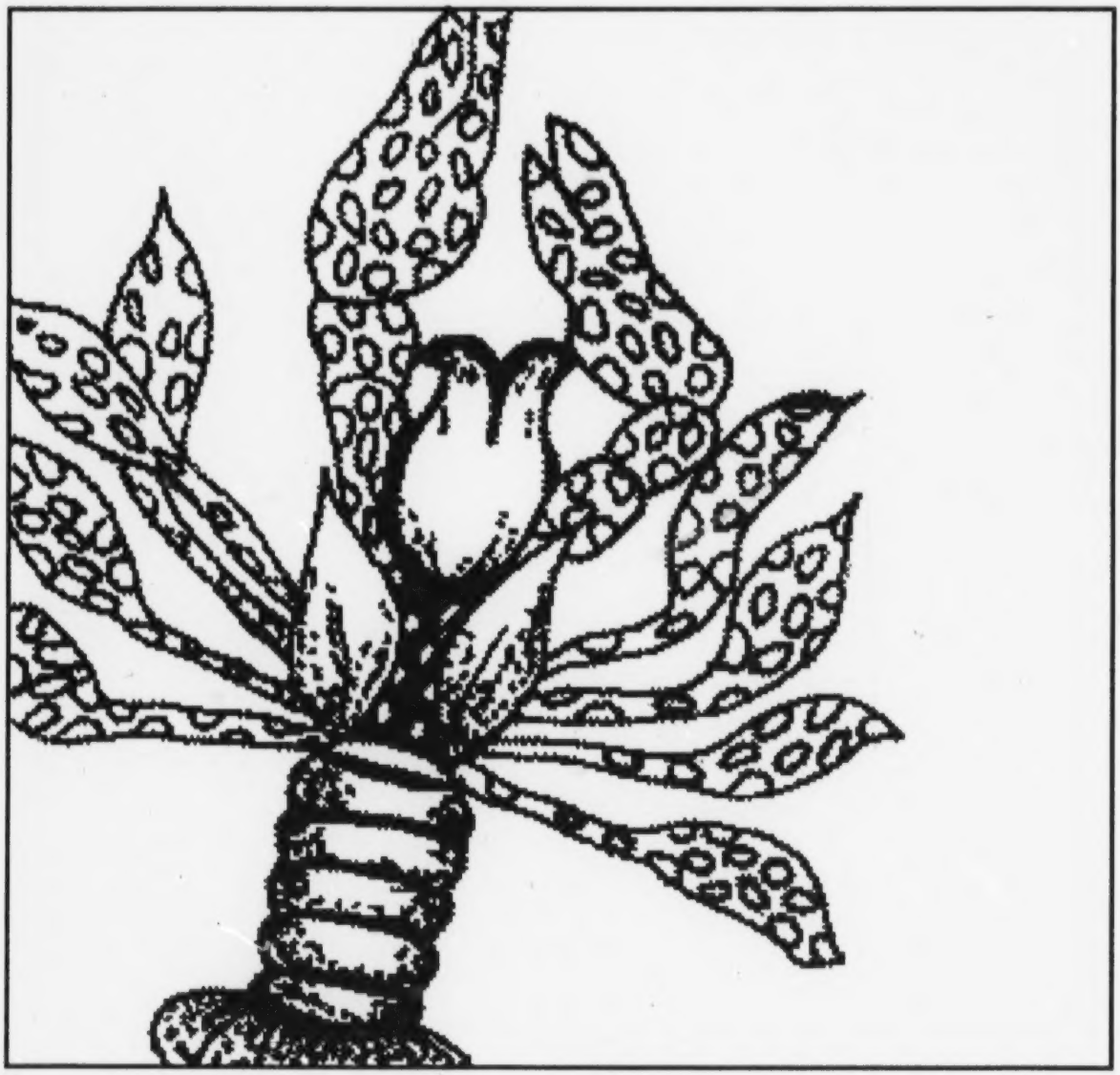
1) What is the name of your **carnivorous** plant?
2) What are the **habitat** needs of your plant? What are the other plants/ animals that live in this **habitat**?
3) What kind of **prey** does your plant trap?
4) What kind of **nutrients** does the **prey** provide?
5) What method(s) does your plant use for attracting **prey**?
6) What is the trapping mechanism of your plant? Describe how it works.
7) How is the **prey** digested?
8) How long does it take for the **prey** to be digested?
9) What are the issues affecting the **survival** of your plant?
10) What are its chances for **survival**? **Extinction**?

**Suggested extensions:**

1) After each trap has been presented, have the students write their own folk story about one of the **carnivorous** plants they have learned about, the plant they just made, or an imaginary trap. Have them recount an encounter with the trap.

2) View the video, "Little Shop of Horrors." Two editions are available - a 1960 edition and a 1986 edition. The 1960 edition is more appropriate for the classroom. Lead a discussion based on the movie's interpretation of **carnivorous** plants versus the actual plants studied at the park. To save time, scenes showing the **carnivorous** plant in the 1960 version can be found at tape counter numbers:

1100 - 1365 Introduction of the Plant
1565 - 1675 The Plant Grows and Talks
1864 - 2230 Food for Audrey II
2130 - 2230 Origin of the Plant



# Post-Visit Activity #2

## Preserving Natural Areas: You Too Can Help!

### Major concepts:

- **Resource management**.
- Preservation of **natural areas**.
- Rare plants.
- **Extinction**.
- Land use planning.

### Objectives:

- Develop an awareness of land use and preservation in the community.
- Identify three agencies in the community that deal with land use issues.
- Identify three agencies in the community that deal with preservation issues.
- List five reasons why one should care about saving **species** and their **habitats**.

### Curriculum objectives met:

- Grade 6 - Theatre Arts: develop confidence in observation and understanding skills while participating in creative drama activities
  Communication Skills: listening, speaking and reading comprehension
  Guidance: demonstrate competencies and skills for interacting with others, discuss the variety and complexity of occupations
  Healthful Living: how people affect the **environment**
  Science: **ecology**
  Social Studies: identify and define problems, gather and evaluate information, draw conclusions
- Grade 7 - Theatre Arts: display initiative while participating in creative drama activities
  Communication Skills: listening, speaking and reading comprehension
  Guidance: develop an awareness of alternative points of view and being responsible in a group
  Science: interactions of people and the **environment**
  Social Studies: identify and define problems, gather and evaluate information, draw conclusions
- Grade 8 - Theatre Arts: participate in creating and producing simple, original scripts
  Communication Skills: listening, speaking and reading comprehension
  Science: **ecology**
  Social Studies: identify and define problems, gather and evaluate information, draw conclusions

**Special considerations:** The facilitator should not display any bias on these delicate issues. Let the students form their own opinions. Be sure to have the students develop arguments from various perspectives; i.e., landowners, developers, conservationists, etc.

**Location:** classroom
**Group size:** 30 to 50, class size
**Estimated time:** 30 minutes
**Appropriate season:** any

**Materials:** copies for each student of Appendices #2 and #3

## Background:

How can you help save rare plants and preserve **natural areas**? Why should you be concerned about saving rare plants and **natural areas**? Appendix #2 Saving **Species**, Why You Should Care poses the question - Why should we care about the accelerating **extinction** rate?

You can help save rare plants by learning about the rare plants that grow in your area and their **habitat** needs. This can help you as a citizen make decisions about community land use planning and the preservation of **natural areas**. Refer to Appendix #3 for a listing of groups and agencies who can offer various perspectives on land use and preservation. Post-Visit Activity #3, Island Paradise, is a nice complement to this activity.

## Instructions:

Hand out Appendix #2 Saving **Species**, Why You Should Care. Discuss land-use and preservation. Have students develop arguments from various perspectives (landowners, developers, businesses, conservationists, hunters, etc.) on one of the following issues. After the students have had time to develop the perspectives of their role, have them act it out and give their view on the chosen issue.

**Sample Scenario**
**Shopping Centers and Housing Developments (Issue #1)**

Developers

The **population** of the area is growing and the residents require housing and shopping areas.

The tourism industry is very important to the area's economy. Tourists visiting the area need accommodations such as motels and condominiums, restaurants and recreation areas such as golf courses, etc.

Developers may find it more cost-effective to clear a tract of all vegetation before building. This would give the construction site a uniform grade. The completed construction site would be landscaped.

Conservationists

Many of the area's lands are considered **wetlands** and thus undevelopable. Conservationists are concerned about the draining of **wetlands** for development. They are also concerned about the siltation of creeks and marshes from the uncontrolled runoff caused by development.

Totally clearing the site disrupts the natural **habitat** for all plants and animals. Leaving some natural vegetation will aid in controlling runoff and result in a less monotonous appearance on the finished product.

**Situations recently arising in the Wilmington, N.C., area that students might be familiar with:**

**1. Shopping Centers and Housing Developments:** Many of the lowlands around Wilmington are **wetlands** which contain **carnivorous** plants. Many of these lowland areas are being developed into shopping centers and housing sub-divisions. Concerned citizens have asked developers and city planning officials to save some of the trees and natural vegetation instead of totally clearing construction areas.

**2. Castle Hayne:** This is a small community north of Wilmington on the Cape Fear River. There is heavy pressure for development of houses along the river. Much of the area along the river is made up of marshes and mature forests.

**3. Golf Courses:** Golf courses have been developed throughout the region. Most are developed by clearing a **savanna** or partially filling in a marsh or swamp.These golf courses destroy the habitats of migratory water birds and **natural areas** containing **carnivorous** plants and have severe **non-point source pollution** problems.

**4. Interstate 40:** This highway connects the west coast of North America to the east coast. Large expanses of land were used to create a corridor in which to construct the highway. Much of the land was forested, farmland or **wetlands** containing **carnivorous** plants.

**Suggested extension**: Invite a representative of a land use agency or preservation organization to discuss that agency's view on preservation and land use with the class. Have students choose from the list in Appendix #3, write necessary letters of invitation, and introduce the guest speaker to the class. Have the students follow with a thank you letter.

# Post-Visit Activity #3

## Island Paradise

### Major concepts:

- Human impacts from land use decisions.
- Responsible human actions and how they affect the **environment**.
- Alternatives for and consequences of human actions.
- Land stewardship.
- Preservation of **natural areas**.

### Objectives:

- Discuss and evaluate the effects of three different land use methods on an island.
- List three ways that people can change their lifestyles to minimize damaging effects to the **environment**.

### Curriculum objectives met:

- Grade 6 - Theatre Arts: develop confidence in observation and understanding skills while participating in creative drama activities
  Communication Skills: listening, speaking and reading comprehension
  Guidance: demonstrate skills for interacting with others
  Healthful Living: how people affect the **environment**
  Science: **ecology**
  Social Studies: identify and define problems, evaluate, organize and analyze information, draw conclusions
- Grade 7 - Theatre Arts: display initiative while participating in creative drama activities
  Communication Skills: listening, speaking and reading comprehension
  Guidance: demonstrate an awareness of alternative points of view and being responsible in a group
  Science: interactions of people and the **environment**
- Grade 8 - Theatre Arts: participate in creating and producing simple, original scripts
  Communication Skills: listening, speaking and reading comprehension
  Science: **ecology**

**Location:** classroom
**Group size:** 30 to 50 class size
**Estimated time:** 45-60 minutes
**Appropriate season:** any

**Credits:** This activity was adapted from the *Aquatic Project Wild* activity, Dragonfly Pond.

**Materials:** For each three students: scissors, masking tape, paste or glue, paper, one set of land use cutouts, one island paradise.

**Educator's information:**

The major purpose of this activity is to encourage students to wrestle with land use concerns. In this simulation, students use the "island" as a microcosm of the environmental issues involved in management decisions. They struggle with the arrangement of overlapping and conflicting land uses in an effort to preserve a **natural area**. When the students reach some kind of agreement about the local issues, have them consider how what they have done affects other islands along the coast. End the activity with consideration of the idea that the planet is, in fact, a single fragile island.

## Instructions:

**1.** Prepare copies of the two worksheets ahead of time. Explain the activity. Tell the students that they will be responsible for arranging the pattern of land use on the island in such a way as to do the best they can to preserve the health of this unique **natural area**.

**2.** Divide the class into groups of three to five, with each group representing one of the interest groups. Students will stay in these groups until the end of the activity. Possible interest groups are:

- Permanent residents - year-round residents of the area.
- Business interests - want to use the land for commerce and economic growth, taking advantage of the potential for tourists to visit the area.
- Highway department and public services - maintain access in the area, to provide highways and fire, police and emergency medical services.
- State park - provides recreation in a natural setting while protecting the natural **environment** and **natural areas**.
- Motel owners and seasonal merchants - provide accommodations and operate other businesses based on the tourist season.
- Marina - provides boater access to the ocean and sells gas and other services to the public.
- Fish processing factory - provides employment, taking advantage of the water and local fisheries.

NOTE: Add others that you think may be locally important.

**3.** Pass out the land use activities and Island Paradise worksheets. Have the students cut out the land use pieces and place them on the island. Tell them that all the land use cutouts must be used. They may be cut smaller than they are, but all parts must be used. They may touch, but they cannot overlap. The students may also create additional land uses of their choosing. When they fasten the cutouts to the island, suggest that they use small loops of tape. This will allow them to change their minds before they paste them down.

**4.** Once the students have cut out the necessary materials and are ready to begin the process of making land use decisions, have them first create a list of pros and cons for each land use. Guide the class discussion so that they consider the consequences of each land use. Record these on the chalkboard. The following are only a few of the many possible examples.

- **Motels and seasonal businesses**

  PRO

  Produce employment.
  Bring tourist dollars into local economy.
  Provide recreation such as amusement parks, etc.
  Educate visitors through sales of Venus flytraps and other **carnivorous** plants.

  CON

  Produce waste and sewage.
  Overtax public services such as police, fire, etc., due to rise in population in tourist season.
  Traffic congestion.
  Destroy habitat.
  **Poaching** of **carnivorous** plants.

- **Marina**

  PRO

  Produce employment.
  Provide the public access to the ocean for boating and fishing.

  CON

  Produce waste from leaking sewage holding tanks on boats.
  Oil and gas spill from faulty fuel lines and refueling of boats.
  Traffic congestion on the water.
  Destroy habitat.

- **State Park**

  PRO

  Outdoor recreation opportunities such as camping, hiking, and picnicking.
  Protection of **natural areas**.
  Bring tourist dollars into local economy as park visitors spend money at area businesses.

  CON

  Some habitat destruction in building of park facilities.
  Produce waste and sewage.

**5.** Have the students work in their teams for a long enough period of time to begin to seriously grapple with the challenge. Offer an opposing viewpoint should they need it.

**6.** Invite each group to display and describe their work in progress. Encourage discussion of their choices. In their discussions emphasize that:

- no land can be excluded
- the **natural areas** must be preserved
- everyone must agree

**7.** Continue the discussion by asking more students to share their proposed plans. Again, be firm in discussing the consequences. Point out that shutting down the businesses and not allowing the factory to locate in the area will be likely to destroy the economic base to the island.

**8.** Give the students additional time to work in their groups to come up with what they believe to be the best possible land use plan, under the circumstances. Be sensitive to their frustrations and display all the final land use plans in the classroom for all to see and discuss. Analyze and discuss the merits of each of the approaches. Point out that although their solutions may not be perfect, they can minimize the damage to the island **natural area**.

**9.** Ask the students to brainstorm possible problems that could be faced within each of their **natural areas** as a result of the human activities on the island. Have them make inferences and predictions about the potential consequences of these problems. Ask them to think about water quality and air pollution as they think about the various plants and animals which live on the land, as well as those who live in the water and air. For example, you could emphasize the effluent from the factory. How will it be treated and by whom? Where will it go and with what effects?

**10.** Ask the students to look again at all of the land uses in this activity. If they had been considering any of them as inherently bad, have them consider a different question. What could the people who are actually in charge of these various land uses do in their practices to minimize the damage to the island? Have the activity end with an emphasis on solutions rather than on problems.

**11.** Ask the students to create a list of things they personally can do to begin to reduce the potentially damaging effects of their lifestyles on the "backyard" habitats they may never have thought about. If possible, invite them to periodically, throughout the school year, report on their progress in carrying out these new practices. Consider with them the idea that all the **natural areas** on the planet are, in fact, part of a single island.

## Suggested extensions:

**1.** Set up an action team to locate a **natural area** in your community. Determine the overall quality of the habitat with which it is connected.

**2.** Trace any stream or river system that passes through your community from its source to its final entrance into the ocean. List all the sites that you can identify that lower the quality of the waters in their journey and suggest how to reverse the process. Contact Stream Watch about watershed protection (see Appendix #3).

**3.** Learn more about environmental impact statements. Try to obtain copies of statements about local **natural areas**. See what concerns are addressed in these documents.

**4.** Find out about private organizations that work to protect **natural areas**. An example is The Nature Conservancy. Others are listed in Appendix #3. Find out about what they do and how they do it.

**5.** Find out about zoning laws and land use regulations in your area. Would the plan your group proposed for the island be allowed in your community?

**6.** Follow-up with Post-Visit Activity #4, Loss of Habitat = Loss of Plants.

## Student's information:

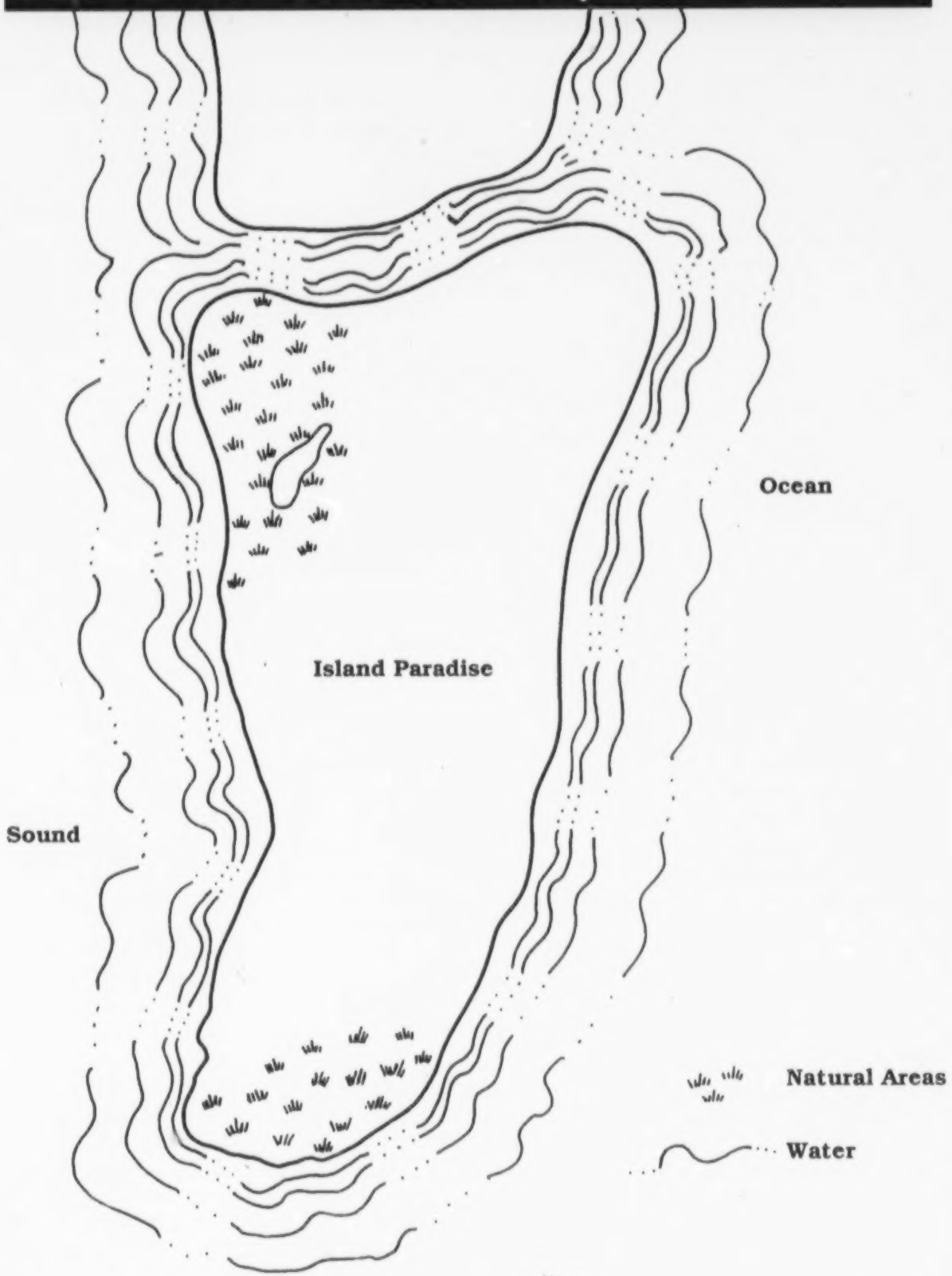
Every way that humans use land affects the **habitat** of plants and animals either in a positive or negative way. What humans choose to do with land is a reflection of human priorities and lifestyles. The search for a modern day "good life" and all of its conveniences produces mixed results for the natural environment. Sometimes people see undeveloped areas of natural **environment** as little more than raw material for human use. Others believe that the natural **environment** is to be preserved without regard for human needs. Still others yearn for a balance between economic growth and a healthy and vigorous natural **environment**. Very real differences of opinion regarding balance exist between well-meaning people!!!

At the core of land use issues is the concept of growth - growth in ecological systems and growth due to development. Every **habitat** has natural limits on the amount of growth it can handle. In a natural system, the amount of growth is self-regulating as the system reaches a point of dynamic balance, such as a climax forest. Human beings have the ability to cause a system to grow beyond its natural limit. For example, people can dam a river system to create power and irrigate crops. **Wetlands** can be drained for building and farming. Skyscrapers can be built to house hundreds of individuals where previously only a few people could live. All of these activities affect the **habitat** for the plants and animals who originally inhabited that system.

**Wetlands**, for example, are often seen as swampy wastelands, yet they are the nurseries for hundreds of forms of wildlife - frogs, migrating birds, fish, beavers, snakes, insects, etc. A remarkable variety of plants make their homes in **wetlands**. The **carnivorous** plants you have learned about are found within or adjacent to **wetlands**. **Wetland** areas, along with the plants and animals found in them are highly vulnerable to human interference with the natural flow of water. Hundreds of thousands of acres of valuable **wetlands** are lost each year to draining, dredging, filling and pollution. With this loss comes the loss of **wetland** plants such as, pitcher plants, sundews, and Venus flytraps.

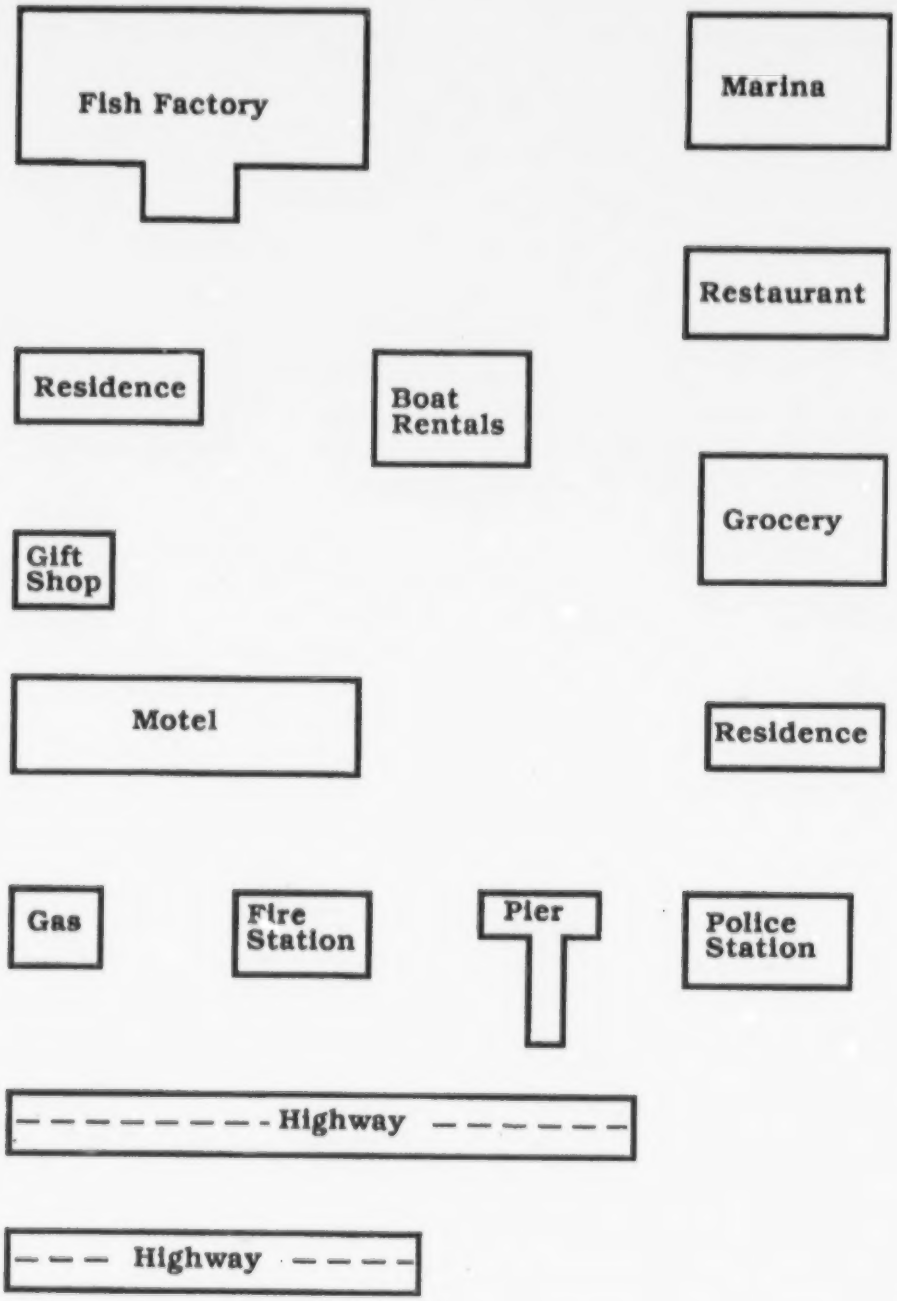
Given the extensive impact humans have had and continue to have on the earth, a major challenge which now faces humans is how to be more responsible about this impact. How can we develop the awareness, knowledge, skills, and commitment that are necessary to encourage humans to be more responsible in actions which affect the remaining **natural areas**? How can we develop the necessary understanding to restore more balance in areas where human disturbance has existed for centuries? Should we set aside **natural areas** to protect the uniqueness and diversity they contain? Should we set aside **natural areas** to save **carnivorous** plants?

# Worksheet for Post-Visit Activity #3



# Worksheet for Post-Visit Activity #3

**Land Use Cutouts**



# Post-Visit Activity #4

## Loss of Habitat = Loss of Plants

**Major concepts:**

- **Habitat** loss.
- **Endangered species**.

**Objectives:**

- Solve problems concerning the number of **carnivorous** plants lost due to development, using math skills.
- Infer what loss of **habitat** may occur in various situations.
- Propose solutions to **habitat** loss.

**Curriculum objectives met:**

- Grade 6 - Communication Skills: reading comprehension
  Healthful Living: how people effect the **environment**
  Mathematics: whole numbers, measurement, probability and statistics
  Science: **ecology**
  Social Studies: identify problems, evaluate, organize and analyze information and draw conclusions
- Grade 7 - Communication Skills: reading comprehension
  Mathematics: whole numbers, measurement, probability and statistics
  Science: interaction of people and the **environment**
  Social Studies: identify problems, evaluate, organize and analyze information and draw conclusions
- Grade 8 - Communication Skills: reading comprehension
  Mathematics: whole numbers, measurement, probability and statistics
  Science: **ecology**, **adaptation**
  Social Studies: identify problems, evaluate, organize and analyze information and draw conclusions

**Location:** classroom
**Group size:** 30 or smaller, class size
**Estimated time:** 15 minutes
**Appropriate season:** any

**Materials:** calculator, "**Carnivorous** Math" worksheet (one per student)

## Educator's information:

This activity uses information gathered in On-Site Activity #1, The **Habitat** Needs of the Venus Flytrap. Students will take the number of **carnivorous** plants growing in one of the plots and apply it to a larger scale **habitat** loss problem.

Upon completion of the worksheet, talk about the following issues and the questions they present. Discuss the rapidly accelerating rate of **extinction** due to urban development. Suggest ways that you can help to protect the Venus flytrap and other plants and animals which are lost when development intrudes.

**1.** Ask the class where they think animals go when land use is changed by development. Some of the animals are able to relocate, but others are "lost" because their **habitat** has been destroyed.

**2.** Ask the class what they think happens to the plants. Discuss the fact that once land is developed, it never returns to a natural state.

**3.** Is development happening near your home? Are the plants and animals there losing their **habitats**? Are these plants and animals unique or valuable? Do we need to set aside and protect some areas of good **habitat** so these plants and animals can have a good home?

# Worksheet for Post-Visit Activity #4

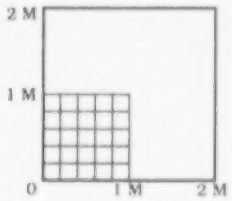
## Carnivorous Math

### Instructions:

Refer to question #5 on the data sheet from On-Site Activity #1 for the plot that had the largest number of Venus flytraps. This will give you the number of **carnivorous** plants found in a 1 meter x 1 meter plot.

**1. a.** How many **carnivorous** plants were found in a 1 meter x 1 meter plot?

Draw in that number in the boxed area representing your study plot.




**b.** How many plants would you expect to find in a 2 meter x 2 meter plot?

**2.** How many plants can be found in an area of suitable **habitat** the size of a soccer field? A soccer field is 50 meters x 100 meters.

**3.** How many plants were lost when a 500 meter x 600 meter area of a suitable **habitat** was developed into a parking lot?

**4. a.** How many plants were lost when a 2 kilometer x 400 meter area of suitable **habitat** was developed into a shopping mall?

**b.** How many acres is this area? _____

**5. a.** How many plants were lost when a 1 kilometer 10 meter x .5 kilometer area of suitable **habitat** was developed into a golf course?

**b.** How many acres is this area? _____

**6.** Using U.S. Customary Units, i.e. foot, yard, mile, convert the metric measurements in the above questions and find the number of plants in the new areas.

1 kilometer = 1000 meters
1 meter = 10 decimeters
1 decimeter = 10 centimeters
1 centimeter = 10 millimeters
4,047 square meters = 1 acre

2.54 centimeters = 1 inch
30.48 centimeters = 1 foot
.9144 meters = 1 yard
1 meter = 1.094 yards
1 acre = 4,840 square yards

# Answer Sheet for Post-Visit Activity #4

## Carnivorous Math

1. **a.** How many **carnivorous** plants were found in a 1 meter x 1 meter plot? **Assuming there were 20 Venus flytrap plants found in your 1 sq m plot.**

   **b.** How many plants would you expect to find in a 2 meter x 2 meter (square meter) plot?
   **2 meters x 2 meters = 4 sq meters**
   **4 sq m x $\frac{20 \text{ plants}}{1 \text{ sq meter}}$ = 80 plants per 2 sq meter plot**

2. How many plants can be found in an area of suitable **habitat** the size of a soccer field? A soccer field is 50 meters x 100 meters.
   **50 meters x 100 meters = 5000 sq meters**

   **5000 sq meters x $\frac{20 \text{ plants}}{1 \text{ sq meter}}$ = 100,000 plants**

3. How many plants were lost when a 500 meter x 600 meter area of a suitable **habitat** was developed into a parking lot?
   **500 m x 600 m = 3000,000 sq meters**

   **300,000 sq m x $\frac{20 \text{ plants}}{1 \text{ sq meter}}$ = 6,000,000 plants**

4. **a.** How many plants were lost when a 2 kilometer x 400 meter area of suitable **habitat** was developed into a shopping mall?
   **2 km x $\frac{400 \text{ m}}{1 \text{ km}}$ = 2000 m 2000 m x 400 m = 800,000 sq meters**

   **800,000 sq m x $\frac{20 \text{ plants}}{1 \text{ sq m}}$ = 16,000,000 plants**

   **b.** How many acres is this area?
   **800,000 sq m x $\frac{1 \text{ acre}}{4{,}047 \text{ sq m}}$ 197,68 acres or 198 acres**

5. **a.** How many plants were lost when a 1 kilometer 10 meter x .5 kilometer area of suitable **habitat** was developed into a golf course?
   **1,010 m x 500 m = 505,000 sq m**

   **505,000 sq m x $\frac{20 \text{ plants}}{1 \text{ sq m}}$ = 10,100,000 plants**

   **b.** How many acres is this area?
   **505,000 sq m x $\frac{1 \text{ acre}}{4{,}047 \text{ sq m}}$ = 124.78 acres or 125 acres**

**4.** Using U.S. Customary Units, i.e. foot, yard, mile convert the metric measurements in questions #1 though #5 and find the number of plants in each new area.

**1. a.** $\frac{20 \text{ plants}}{\text{sq m}} = \frac{.9144 \text{ m} \times .9144 \text{ m} = 0.8361 \text{ sq m}}{\text{sq yd}} = 16.72$ plants or **17 plants / sq yd**

**b.** 2 m = 2.188 yds
2.188 yds x 2.188 yds = 4.787 sq yds
4.787 sq yds x $\frac{16.72 \text{ plants}}{1 \text{ sq yd}}$ = **80 plants**

**2.** 50 m x $\frac{1.094 \text{ yds}}{1 \text{ m}}$ = 54.7 yds
100 m x $\frac{1.094 \text{ yds}}{1 \text{ m}}$ = 109.4 yds
54.7 yds x 109.4 yds = 5984.2 sq yds
5984.2 sq yds x $\frac{16.72 \text{ plants}}{\text{sq yd}}$ = **100,056 plants**

**3.** 500 m x $\frac{1.094 \text{ yds}}{1 \text{ m}}$ = 547 yds
600 m x $\frac{1.094 \text{ yds}}{1 \text{ m}}$ = 656.4 yds
547 yds x 656.4 yds = 359050.8 sq yds
359050.8 sq yds x $\frac{16.72 \text{ plants}}{\text{sq yd}}$ = **6,003,329 plants**

**4. a.** 2 km x $\frac{1000 \text{ m}}{1 \text{ km}}$ x $\frac{1.094 \text{ yds}}{1 \text{ m}}$ = 2188 yds
400 m x $\frac{1.094 \text{ yds}}{1 \text{ m}}$ = 437.6 yds
2188 yds x 437.6 yds = 957,468.8 sq yds
957,468.8 x $\frac{16.72 \text{ plants}}{\text{sq yd}}$ = **16,008,878 plants**

**b.** 957, 468.8 sq yds x $\frac{1 \text{ acre}}{4.840 \text{ sq yds}}$ = 197.8 acres or **198 acres**

**5. a.** 1010 m x $\frac{1.094 \text{ yds}}{\text{m}}$ = 1,104.9 yds
500 m x $\frac{1.094 \text{ yds}}{\text{m}}$ = 547 yds
1,104.9 yds x 547 yds = 604,380.3 sq yds
604,380.3 sq yds x $\frac{16.72 \text{ plants}}{\text{sq yd}}$ = **10,105,239 plants**

**b.** 604,380.3 sq yds x $\frac{1 \text{ acre}}{4,840 \text{ sq yds}}$ = 124.8 acres or **125 acres**

# Post-Visit Activity #5

## This Pitcher's A Catcher!

**Major concept:**

- Design and function of a model of a pitcher plant.

**Objectives:**

- Construct a toy pitcher plant that functions like a real plant.
- Describe and evaluate the trapping methods of pitcher plants.

**Curriculum objectives met:**

- Grade 6 - Visual Arts: develop positive attitudes and the skills necessary for understanding the role creativity plays in art and in producing art
  Communication Skills: listening skills
- Grade 7 - Visual Arts: develop positive attitudes and the skills necessary for understanding the role creativity plays in art and in producing art
  Communication Skills: listening skills
  Science: characteristics of plants
- Grade 8 - Visual Arts: develop positive attitudes and the skills necessary for understanding the role creativity plays in art and in producing art
  Communication Skills: listening skills
  Science: **adaptation**

**Location:** classroom
**Group size:** 30 or smaller, class size
**Estimated time:** 30-45 minutes
**Appropriate season:** any

**Credits:** This Pitcher's A Catcher! activity is adapted from the National Wildlife Federation's *NatureScope*, "Wading Into Wetlands".

**Materials:** Copies of "This Pitcher's a Catcher" worksheet (one per student), thin cardboard (about the thickness of a file folder), 3⁄4" x 4" (2 x 10-cm) strips of paper (three per person), 11" (28-cm) pieces of string (one per student), scissors, pencils, glue, tape, crayons or markers, and pictures of pitcher plants

**Instructions:**

Before beginning the activity, lead a brief discussion about how and why pitcher plants "eat" insects. Emphasize that pitcher plants do not actively seek out their **prey**. Refer to Appendix #1, Pitcher Plant Fact Sheet. Give each student a copy of "This Pitcher's A Catcher" worksheet.

Have students construct their own fly-catching pitcher plant using these directions:

1. Trace the pitcher plant pattern onto a piece of thin cardboard and cut it out.

2. Color both sides of the cut-out referring to pictures of pitcher plants for accurate color.

3. Roll the cut-out into a cone (see diagram). Tape the outside edge to hold the cone together.

4. Glue one of the fly pictures to a small piece of cardboard, then cut it out along the solid black line. (If the students wish to color their flies, have them do so before gluing the flies to the cardboard.)

5. Glue one end of the string to the other side of the cardboard. Then cut out the second fly picture and glue it over the string.

6. To make the downward-pointing hairs that line the inside of pitcher plants, fold the strips of paper in half lengthwise. Cut diagonal slits in one half of each strip (see diagram).

7. Apply a line of glue to the uncut side of each strip and carefully glue the "hairs" to the inside of the cone (see diagram). Make sure the hairs point down toward the base of the cone. Repeat for the other two strips. (You might want to use a pencil to guide the hairs in place.)

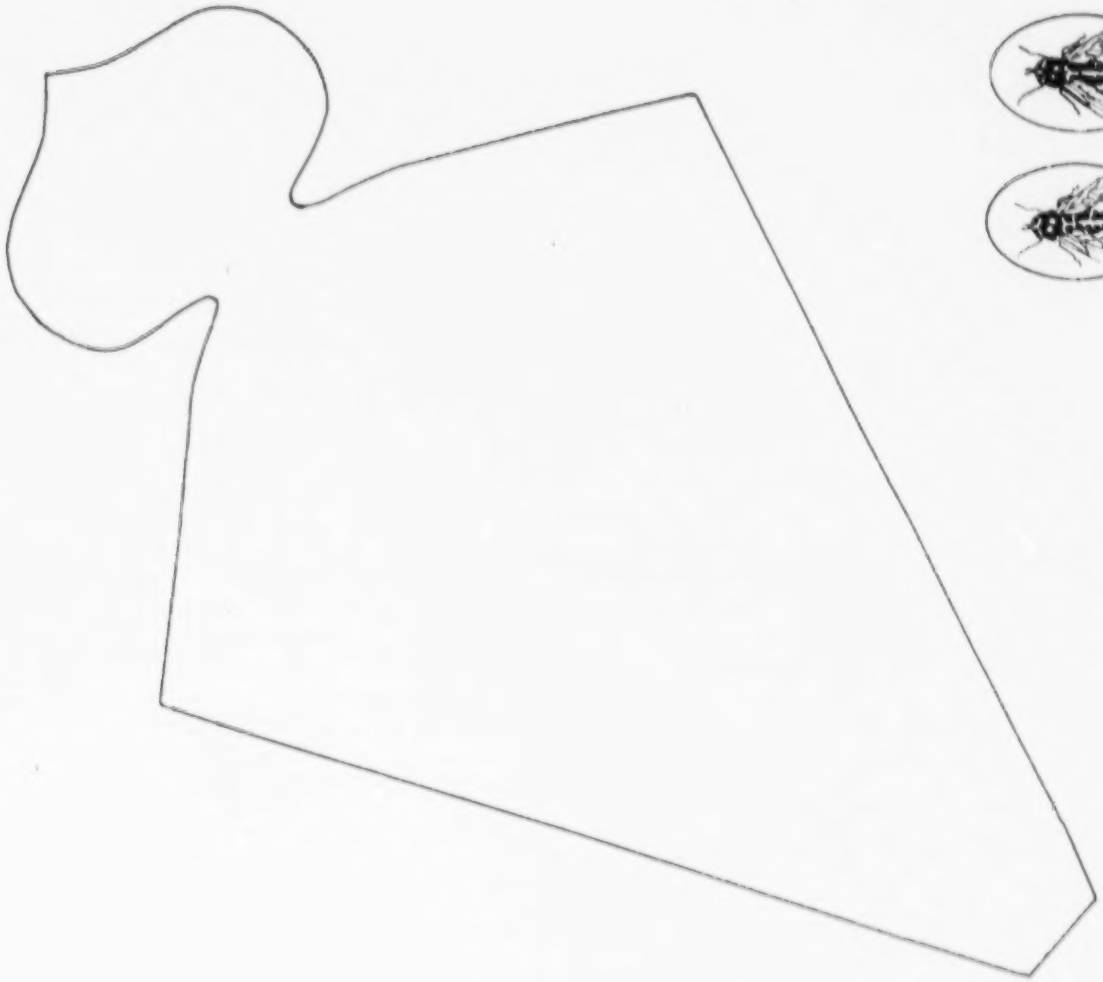
8. Tape the loose end of the string to the inside front lip of the pitcher plant (see diagram).

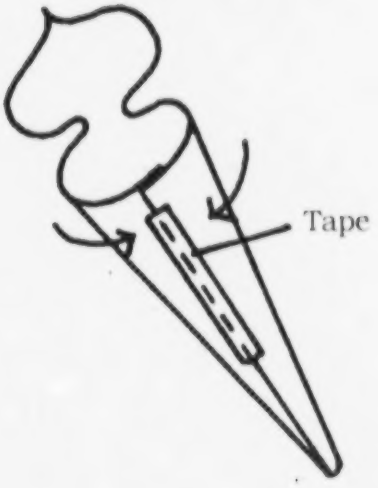
9. Curl the "hood" by rolling it around a finger and holding it in place for a moment.

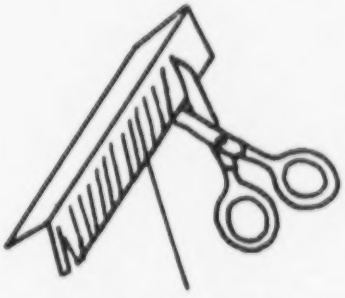
Now the pitcher plants are ready to catch flies! With a little practice students can make their models catch insects over and over again! Make sure the students realize the true plants are not "active" in catching insects as the models are.

# Worksheet for Post-Visit Activity #5

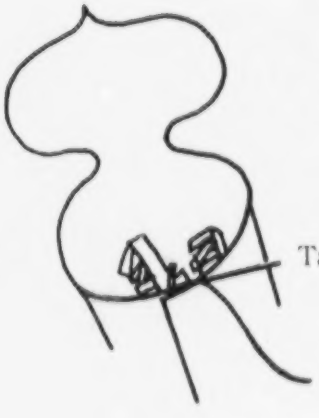
**Pattern for This Pitcher's A Catcher**

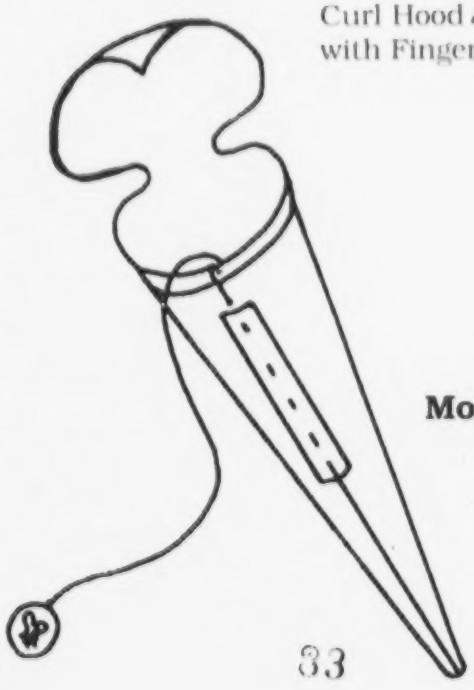




Downward Pointing Hairs
Cut Diagonal Slits in Paper





**Model Pitcher Plant**

# Post-Visit Activity #6

## Eat to Compete: Dietary Supplements

**Major concepts:**

- Nutrition.
- Dietary supplements.
- **Adaptation**.

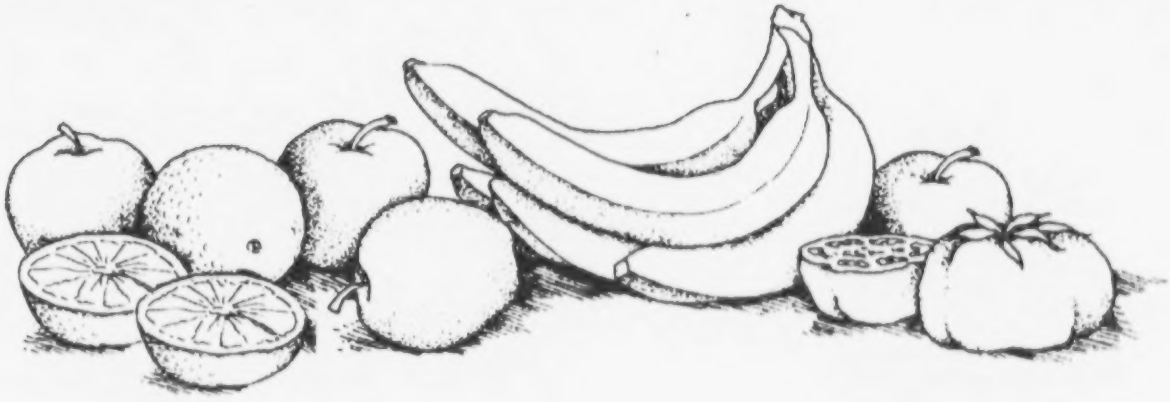
**Objectives:**

- Explain why **carnivorous** plants supplement their diets.
- Determine which dietary supplements help humans to become more vigorous and which dietary supplements are of little nutritional value. Name three of each.
- Describe under what circumstances it may be necessary to supplement basic **nutrients**.

**Curriculum objectives met:**

- Grade 6 - Communication Skills: reading comprehension
  Guidance: demonstrate competencies and skills for interacting with others
  Healthful Living: personal health responsibilities
  Mathematics: whole numbers
  Science: care of the human body
  Social Studies: identify problems, evaluate, organize, and analyze information and draw conclusions
- Grade 7 - Communication Skills: reading comprehension
  Guidance: demonstrate being responsible in a group
  Healthful Living: nutrition
  Mathematics: whole numbers
  Science: human growth and development
  Social Studies: identify problems, evaluate, organize and analyze information, draw conclusions
- Grade 8 - Arts Education: take responsibility for proper care of the body
  Communication Skills: reading comprehension
  Healthful Living: nutrition
  Mathematics: whole numbers
  Social Studies: identify problems, evaluate, organize and analyze information, draw conclusions

**Location:** classroom
**Group size:** 30 or smaller, class size
**Estimated time:** 45 minutes
**Appropriate season:** any



**Materials:** "Suggested Foods" worksheet (one per student) or actual foods, cards or empty food containers to represent foods listed on the worksheet.

## Educator's information:

This exercise will help students to understand that **carnivorous** plants, like humans, are living things and that they use dietary supplements to become more vigorous, just as humans do. Foods will be divided into two groups - foods available for **survival** (representing food made in **photosynthesis**) and supplements (representing trapped insects). Teams will compete to be the healthiest by choosing items from the supplement group which will help them to become more vigorous and more able to compete in their **environment**. Each of the supplementary foods has been assigned points representing its nutritional value. The team who chooses foods with the highest **nutrient** total wins.

Divide the students into teams of four or five. Arrange the food into the two categories - minimum diet and supplements. Read the student's background information to the students. Additional background may be found in the introductory background, "How Plants Eat" and in Appendix #1. Following the activity, ask students the following questions:

1) Why do you think that **carnivorous** plants developed methods to supplement their diets?
2) Name some situations when it might benefit you to supplement your diet so that you might perform at your best (i.e., tests, athletic competitions). Which foods would you choose for these situations and why?
3) Can you think of a way besides food that people supplement their diets?

A listing of suggested foods and a number representing their nutritional value follow on the answer sheet. A breakdown of **nutrient** content for each of the foods may be found in Appendix #4.

## Student's information:

**Carnivorous** plants, like other green plants, use **chlorophyll** and sunlight to manufacture food through the process of **photosynthesis**. The water and **nutrients** necessary to carry out this process are extracted from the soil by the plant's roots. The food produced by **photosynthesis** supplies the minimum requirements necessary for the plant's **survival**. Since **carnivorous** plants grow in soil that is **nutrient**-poor, they supplement their minimum diets with **nutrients** obtained from the small organisms that they trap and digest. Without these additional **nutrients**, **carnivorous** plants would likely survive, but they would be less able to successfully compete with other plants.

The minimum **nutrients** necessary for human **survival** are readily available to us in this region, but, like **carnivorous** plants, we supplement this minimum diet with additional **nutrients**. If we ate only the minimum diet and did not supplement it, we, like **carnivorous** plants, would survive, but we might not be in our most healthy state, nor would we be able to perform at our best.

Some of the foods we use to supplement our diets have a higher nutritional value than others. The higher the **nutrient** value of a food, the more it enables us to successfully compete in our **environment**, just as the **nutrients** from the insects help **carnivorous** plants to compete in their **environment**.

## Instructions:

In this exercise, each team will compete to see who will be the healthiest. The foods in category 1 are staples in the diet of this region. They are your basic balanced diet and provide the dietary requirements necessary for your **survival**, just as photosynthesis does for plants. The foods in category 2 are foods that you may select to supplement your basic diet in order to become more vigorous and healthy, just as **carnivorous** plants supplement their diet with insects. Each of the foods in the supplementary group has been assigned a number which represents its nutritional value. Choose six items from the supplementary foods to supplement the basic diet you have been given. The team with the highest number of nutritional points will be the healthiest.

Upon completion of this activity, we will discuss the following:

1) Why do you think that **carnivorous** plants evolved to supplement their diets?
2) Name some situations when it might benefit you to supplement your diet so that you might perform at your best (i.e., tests, athletic competitions). Which foods would you choose for these situations and why?
3) Can you think of a way besides food that people supplement their diets?

# Worksheet for Post-Visit Activity #6

**Suggested Foods**

**Category # 1 - Basic Minimum Diet** (from this region)

collards
honey
grape juice
poultry
apple juice
sweet potatoes
milk
soybeans
corn
apples
strawberries

**Category # 2 - Dietary Supplements** (Choose six items)

**Proteins:**

Tuna
Hamburger
Hot Dogs (2)
American Cheese (pasteurized)
Eggs (2)

**Drinks:**

Cola/Soft Drink
Iced Tea (w/sugar & lemon)
Tomato Juice

**Snacks:**

Peanuts (36)
Ice Cream
Oatmeal Cookies (2)
Chocolate Bar

**Fruit:**

Pears
Oranges
Bananas
Watermelon

**Vegetables:**

Broccoli
Carrots
Mushrooms
French Fries

# Answer Sheet for Post-Visit Activity #6

**Points for Nutritional Value** (Category # 2 - Dietary Supplements)

| **Proteins:** | |
|---|---|
| Tuna | 15 |
| Hamburger | 10 |
| Hot Dogs (2) | 5 |
| American Cheese (pasteurized) | 20 |
| Eggs (2) | 20 |

| **Drinks:** | |
|---|---|
| Cola/Soft Drink | 5 |
| Iced Tea(w/sugar & lemon) | 5 |
| Tomato Juice | 25 |

| **Snacks:** | |
|---|---|
| Peanuts (36) | 10 |
| Ice Cream | 20 |
| Oatmeal Cookies (2) | 20 |
| Chocolate Bar | 15 |

| **Fruit:** | |
|---|---|
| Pears | 10 |
| Oranges | 15 |
| Bananas | 15 |
| Watermelon | 25 |

| **Vegetables:** | |
|---|---|
| Broccoli | 25 |
| Carrots | 25 |
| Mushrooms | 10 |
| French Fries | 5 |

# VOCABULARY

**adaptation** - a change in the function or structure of a plant or animal that allows it to better adjust to its **environment**.

**boggy** - waterlogged ground generally found in **wetlands** which often quakes when walked upon; swampy.

**carnivorous** - flesh-eating or predatory. Capable of trapping and absorbing (eating) insects or other small organisms; insectivorous.

**chlorophyll** - the chemical found in green leaves which plays a part in **photosynthesis**.

**compete** - the process by which two or more organisms struggle for food, water, shelter, etc. when the available supply is limited.

**controlled burn** - prescribed fire to burn vegetation. This practice safely burns grasses and shrubs in a effort to improve the **habitat** for plants and/or wildlife.

**digestive enzymes** - substances made by **carnivorous** plants (as well as animals) that help change the animals they trap into a form that can be absorbed by the plant.

**ecology** - the science of the inter-relationships between organisms and their surroundings.

**endangered species** - a **species** which will very likely become extinct unless active preservation and management of the **species** and its **environment** increase the **population**.

**endemic** - a plant or animal that is **native** to a certain region and grows or lives naturally nowhere else in the world.

**environment** - all of the living and non-living conditions, factors and influences which surround a plant or an animal.

**extinction rate** - the rate at which plant and animal **populations** decrease to the point that none of the **species** are living.

**firebreak** - a barrier or cleared space around an area to be burned which contains the fire to prevent it from spreading. The barrier may occur naturally or may be manually prepared.

**folklore** - beliefs, customs and traditions that are passed on from generation to generation in the form of stories, legends, myths, songs, etc.

**fungus** - a plant such as a mushroom or mold.

**gland** - an organ or cell that secretes a substance such as a digestive enzyme.

**habitat** - the location where a plant or animal lives, including its surrounding **environment**.

**mucus** - a sticky or clammy coating.

**native** - something which grows naturally or in the wild.

**natural area** - a place which has not been developed and exists in its natural state.

**non-point source pollution** - type of pollution that can not be attributed to one specific source. Originating from non-specific locations such as erosion, sewer systems, oil from boats, and wash-off from roads.

**nutrient** - something that provides food value. Some foods have more **nutrients** (value) than others.

**peat** - partly decomposed plant matter usually found in **boggy** areas.

**pH** - a measure which indicates the relative acidity or alkalinity of a substance. The **pH** scale ranges from 0 (most acid) to 14 (most alkaline) with a **pH** of 7 being neutral.

**photosynthesis** - the process by which the cells in green plants that contain **chlorophyll** harness energy from the sun to make the food (from water ($H_2O$) and carbon dioxide ($CO_2$)) that the plant needs to grow.

**poaching** - the illegal taking of plants and animals.

**pocosin** - a type of **wetland** which is dominated by dense stands of broad-leaf evergreen shrubs or low trees.

**population** - the total number of a particular plant or animal living in a given area.

**prey** - an organism hunted or caught for food.

**resource management** - practices, such as **controlled burning**, which are designed to improve the **habitat** of plant communities and/or wildlife.

**savanna** - a relatively flat grassland with a scattered tree canopy.

**species** - a classification of plants or animals which groups together organisms which are most similar and can breed with one another.

**survival** - the ability to continue life.

**wetland** - a low lying area, such as a swamp, marsh or **pocosin**, whose soils are waterlogged for at least part of the year.

**wildflower** - a non-domesticated **native** plant which blooms.

## APPENDIX # 1

# Bladderwort Fact Sheet

**Common Name:** Bladderwort
**Scientific Name:** *Utricularia sp.*

**Description**
The main parts of the bladderwort are beneath the ground in the damp, sandy soil. The plant is difficult to spot without the yellow flowers which appear in the spring. Underground is a branching stem which divides further into fine branches with tiny bulb like traps. Each trap has a one-way door operated by a feather-like trigger.

**Distribution**
Found throughout the eastern third of North America, but mostly in the southeastern coastal plain. This large genus occurs worldwide and consists of some 250 **species**. A great many are aquatic but many grow in acidic, sandy and **boggy** sites. There are four **species** of bladderworts living at Carolina Beach State Park.

**Habitat**
Damp, sandy, acidic soils. Bladderworts are commonly seen in basic **pH** bog situations such as Carolina Beach State Park where they grow on the edges of lime-sink ponds.

**Adaptations**
The bladderwort is considered to have the most sophisticated trapping device among **carnivorous** plants. The tiny **prey** caught in the traps is digested and the **nutrients** from its body supplement the food that the plant makes by **photosynthesis**.

**Feeding Mechanism**
The tiny underground traps are similar to round bubbles with a partial vacuum inside. A feather-like trigger sticks out of the double sealed trap door. When an unlucky victim touches the trigger, the trap door suddenly opens, sucking the victim into the trap. At the bottom of the trap, a small pool of water contains **digestive enzymes** that disintegrate the **prey**. The trap is reset over a period of 15 to 30 minutes when the excess water is absorbed and another partial vacuum is created.

**Behavior**
Rapid plant movement takes place as part of the trapping process making the bladderwort an active trap.

**Fun Facts**
- Most bladderworts eat water fleas, mosquito larvae and, occasionally, a tiny tadpole. If a **prey** longer than the bladderwort, itself, is ingested, the portion of the animal inside the trap will be digested and the trap will be reset. If another stimulus occurs, the rest of the **prey** may be ingested. If the trap is not stimulated again right away, the remaining portion of the **prey** will fall away.
- At no time in their life history do bladderworts have any type of roots.
- The speed of the trapping process is estimated at 1/460 of a second.

**Bladderwort**
*Utricularia sp.*

**Scale x 2**

## APPENDIX # 1

# Butterwort Fact Sheet

**Common Name:** Butterwort
**Scientific Name:** *Pinguicula pumila*; The Latin word pingus meaning fat, refers to the greasy feel of the leaves. The suffix -ula - means little one.

**Description**
The butterwort is a small, very low growing plant with bright-green to yellowish leaves which radiate from a central point. The margins of the leaf are upturned or curled inward. The leaf surface has a fine pebbled texture and a greasy feel due to the presence of numerous **mucus**-producing **glands**. A single lavender flower blooms on a tall stalk in the late spring.

**Distribution**
**Species** of butterwort grow across the northern half of North America and extend down into the coastal plain in the southeast and into northern California in the west. Three **species** grow in North Carolina.

**Habitat**
Moist to wet soils. In Carolina Beach State Park the butterworts grow along the edges of lime-sink ponds.

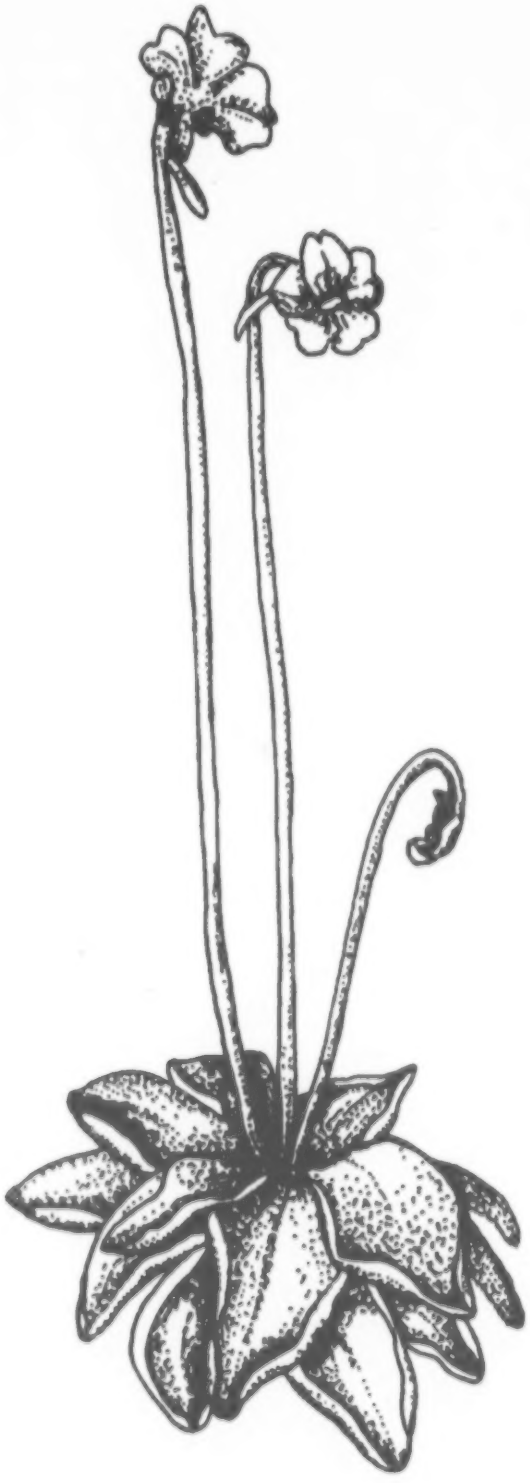
**Adaptations**
The butterwort, like other green plants, carries on **photosynthesis**. It supplements the **nutrients** it needs with **nutrients** from the bodies of small insects that it traps and digests.

**Feeding Mechanism**
The leaves do not have nectar **glands** to attract insects but, rather, they have a **fungus**-like scent which attracts the **prey**. Small **prey** landing or crawling on the leaf's surface become mired down by the **mucus** secretions. The edges of the leaf move inward slightly and the leaf's interior sinks and forms a shallow well under the **prey**. The **prey** is held fast as more mucous is secreted which suffocates the unlucky victim. The leaves have two types of **glands**; one secretes oily **mucus**, the other secretes **digestive enzymes** and a mild acid which dissolve the soft body parts of the **prey** and absorb the nutritive portions into the plant.

**Behavior**
Some plant movement does take place as the leaf curls inward slightly and sinks to form a shallow well under the **prey**; thus, the butterwort is a semi-active trap.

**Fun Facts**
- In Scandinavia, the leaves are used as a medicine by rubbing them on the open sores of animals to make them heal faster. There is actually an antibiotic in the plant's digestive fluid.
- In the past, the plant was commonly used as a milk coagulant in home dairy recipes. There is no known scientific basis for this effect; however it works.
- People in Northern Europe mix the leaves or leaf extract of certain **species** with milk in order to curdle it and produce a pudding dish like yogurt.
- The **prey** of the butterwort are tiny insects such as gnats and midget-sized flies which they often catch in great numbers.

**Butterwort**
*Pinguicula pumila*



**Scale x 2**

## APPENDIX # 1

# Pitcher Plant Fact Sheet

**Common Name:** Yellow pitcher plant, or trumpets, and purple pitcher plant.
**Scientific Name:** *Sarracenia flava* (yellow pitcher plant) and *Sarracenia purpurea* (purple pitcher plant).

**Description**
The pitcher plant radiates from a central point with leaves modified into funnel-shaped traps. Large showy flowers appear in early spring. A single yellow or purple flower hangs down from a tall stem. The yellow pitcher plant is upright while the purple pitcher plant lies horizontal and is curved. The traps or pitchers of the yellow pitcher plant may be 12 to 36 inches tall. The flowers have a strong musky scent. The usual **prey** is flying insects. The traps or pitchers of the purple pitcher plant are 4 to 10 inches long. They lay on the ground, flaring upward and open like a mouth. The purple flowers have no odor.

**Distribution**
Various **species** can be found in bogs, **savannas** and wet places throughout eastern North America. Six **species** grow in North Carolina most commonly in the southeastern **wetlands** but also in wet mountain **habitats**. The limited number of **habitats** make these plants rare.

**Habitat**
The moist, sandy acidic area in pine-grass **savannas** and wet **pocosin** edges is the **habitat** of yellow and purple pitcher plants, though some may be found in mountain bogs. The soils are **nutrient** poor in these areas. (Pine **savannas** were once abundant in the southeastern part of the state. Today, due to development and agriculture their numbers are few.)

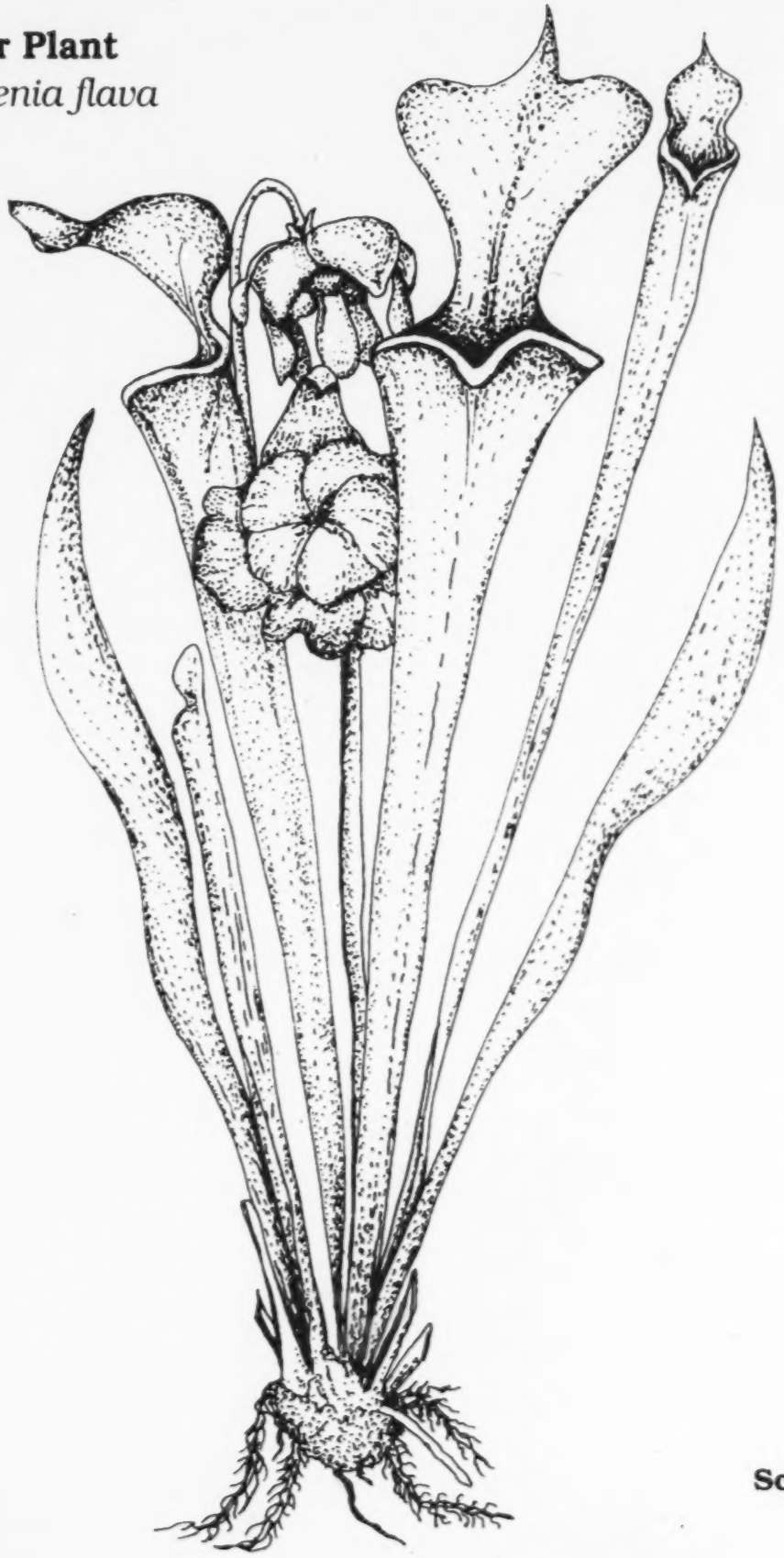
**Adaptations**
Pitcher plants carry on **photosynthesis** like other green plants. They also supplement the **nutrients** they need with **nutrients** from the bodies of small animals that they trap, kill and digest. The pitcher plant has an underground stem or rhizome. The soil protects this rhizome and makes it possible for the pitcher plant to sprout back strongly in a burned area. Without **controlled burning** of its **habitat**, woody shrubs and other plants move in and crowd out the pitcher plants.

**Feeding Mechanism**
The trap or pitcher by its ingenious design is a mixture of bait and lures that attract insects to a pitfall trap filled with digestive fluid. An ant or flying insect is attracted to the colorful rim of the pitcher where nectar-producing **glands** are concentrated. The nectar leads the **prey** down into the pitcher to insure its capture and prevent escape. The **prey** tumbles through an area of downward pointing hairs, a slippery area and an area with glass-like hairs before reaching the bottom and drowning in a pool of liquid. The liquid contains enzymes which digest the soft body parts of the insect and absorb them into the plant.

**Behavior**
Pitcher plants are considered passive traps since no movement is involved in the trapping of the **prey**.

**Fun Facts**
• Although the digestive juices are powerful enough to dissolve small snails, some insects can actually live in the liquid unharmed. The larvae of one mosquito **species** hatch and swim in the liquid until they emerge as adults.

**Pitcher Plant**
*Sarracenia flava*



**Scale x 1/2**

## APPENDIX # 1

# Sundew Fact Sheet

**Common Name:** Sundew
**Scientific Name:** *Drosera intermedia* and *Drosera capillaris*. Drosera is derived from the Greek word droseros, meaning glistening in the sun.

**Description**
The sundew is a low growing plant with spoon-shaped leaves that radiate from a central point. The leaves are up to 1 1/2 inches long and are round and broad at the tip tapering to a narrow stalk. The upper surface is covered with red hair-like **glands** tipped with a clear **mucus**-like secretion. Often the plant seems to sparkle in the sunlight as if the leaves were covered with dew. Tiny white flowers on a tall stalk appear in the summer months.

**Distribution**
Found in wet, **boggy** sites over most of the eastern third of North America. Five **species** live in North Carolina.

**Habitat**
Grows in wet areas, such as the edges of streams, ponds, swamps and drainage ditches. In Carolina Beach State Park sundews grow along the edges of lime sink ponds.

**Adaptations**
Sundews carry on **photosynthesis** like other green plants, but they also supplement their diet with the **nutrients** from the bodies of small insects that they trap, kill and digest. The sundew is among the first plants to come back after sites have been cut and burned.

**Feeding Mechanism**
The red color and moist surface of the leaves entice the **prey** into a sticky trap. The elongated **glands** on the top of the leaves secrete **mucus** which catches, digests and absorbs the **prey** into the plant. As the insect struggles in the sticky trap more **mucus** is released. The **glands** bend inward securing the **prey** for digestion. The mechanism for bending is due to a growth phenomenon in which the sides of the **glands** grow unequally, forcing inward movement. How this happens is not fully understood.

**Behavior**
Some plant movement does take place as the **glands** bend inward, making the sundew a semi-active trap.

**Fun Facts**
- There are over 90 recognized **species** of Drosera.
- The leaf blade may be as small as 1/20 of an inch to over 2 feet. A giant sundew in South Africa is capable of devouring small animals in its traps.
- The extraordinary digestive system of the sundew digests the **prey** within a few hours.

**Sundew**

*Drosera intermedia*

**Scale x 4**

**APPENDIX # 1**

# Venus Flytrap Fact Sheet

**Common Name:** Venus flytrap
**Scientific Name:** *Dionaea muscipula*; Dionaea is one of the Greek names for Venus. There is only one **species** in this genus.

**Description**
The Venus flytrap is a low growing plant with leaves which grow in clusters and radiate from a central point. The leaves of these basal rosettes form a unique trap with two jaw-like lobes on a midrib and a narrow to broad leaf stem or petiole. The plant is usually only a few inches across with individual traps about an inch long. The margins of each trap are lined with a series of teeth and there are three trigger hairs near the center of each lobe. When this sun-loving plant gets enough sun there is a reddish color inside the traps. In late May and early June the flytrap grows white flowers with green veins on a tall, leafless stalk which extends out of the basal rosette.

**Distribution**
The Venus flytrap has a limited range in the coastal area of southeastern North Carolina and into South Carolina in an area approximately 60-75 miles around Wilmington, North Carolina. The Venus flytrap is an **endemic species** growing only where its particular **habitat** occurs. Specific moisture, the presence of fire and particular soil conditions in the coastal area have created its ideal **habitat**.

**Habitat**
The Venus flytrap grows in wet, acidic, sandy-**peaty** soils in evergreen shrub bogs (**pocosins**) and long leaf pine **savannas**. In Carolina Beach State Park, the Venus flytrap grows along the moist edges between the **pocosins** and **savannas**.

**Adaptations**
Venus flytraps carry on **photosynthesis** like other green plants. They supplement their diet with **nutrients** from the bodies of the small animals that they trap, kill and digest. The Venus flytrap has a well-protected, fleshy underground stem called a rhizome. Since the stem is well-protected by the soil, the flytraps are among the first plants to sprout back in a burned area. If the area is not burned from time to time, other herbs, shrubs and trees will invade and crowd out the small flytraps.

**Feeding Mechanism**
The trap attracts **prey** with a sweet smell and the reddish surface of its lobes. The closing of the trap takes place in two phases - the shutting phase and the narrowing phase. In the shutting phase, the lobes close to the point that the teeth interlock forming a cage, while the trap remains slightly open. This prevents the escape of larger insects, while allowing the smaller ones to walk safely out. In the narrowing phase, the two lobes move closer together and seal. When digestion begins, acids and enzymes pour from the digestive **glands**. The plant absorbs the nutritive portions of the insect over a period of three to five days. The skeleton and wings stay in the trap until they are washed out by the rain.

The working of the trap mechanism is little understood at this time. There is no satisfactory explanation for how the trigger hairs release the pressure which holds the two lobes apart during the shutting phase. The narrowing phase is known to be a growth phenomenon. The outer surface of the lobes grows while the inner surface does not, forcing the trap to close. Upon opening the inner surface grows while the outer one does not.

**Behavior**
Some rapid plant movement takes place as part of the trapping process making it an active trap. A small but consistently measurable electric current crosses the leaf after the trigger hairs are stimulated.

**Fun Facts**
- Although the plant definitely traps flies, its primary food source is large ants.
- In order for the trap to close, any one of the three trigger hairs on the inner surface must be touched twice, or two separate hairs touched in succession.
- The inside of the trap is lined with nearly microscopic digestive **glands**, three fine trigger hairs and nectar secreting **glands**. The trap lining is colored green to pale yellow or red. The trap is normally at a 45 degree open position when undisturbed.
- Each trap may catch and digest **prey** up to three times. After that the trap dies. New traps grow all season.
- One **folklore** tidbit is that Venus flytraps came from asteroids which broke off of the planet Venus. These asteroids fell to earth forming the Carolina bays and spreading Venus flytraps across this narrow region of the coastal plain.

**Scale x 2**

**APPENDIX # 2**

# Saving Species: Why You Should Care

The endangerment and **extinction** of plants and animals is a problem of enormous importance today and threatens our welfare with adverse consequences. **Extinction**, however, is a natural phenomenon. What is unnatural is the current rate of **extinction**. In a week the earth is losing more **species** than scientists estimate disappeared over three previous centuries.

Why should we care about this accelerating **extinction rate**? Why should we care about the protection of endangered **species**? Consider the following reasons.

**❶ Medicine:**
50% of all medications originate from wild plants and animals and 25% of our prescription medicines come from chemical compounds discovered in nature. **Natural areas** are living warehouses for tomorrow's medical discoveries, yet they are being destroyed faster than they can be explored for their medicinal properties. Plants from the tropical areas of the world tend to be especially high in chemicals of medicinal value.

**❷ Agriculture:**
Approximately 40% of the higher productivity in agriculture is due to genetic breeding of domestic crops with closely related plants. Many of the **natural areas** where these related plants may grow are disappearing rapidly.

**❸ Industry:**
Many plants are now being used for their natural oils (jojoba shrub), natural rubbers (guayule shrub), and emulsifiers (seaweed).

**❹ Interconnection:**
The effects on an ecosystem reach across the borders of states and nations. Migratory birds dying from lack of suitable **habitat** in North, Central and South America will certainly be missed as predators of insect pests that harm our crops and forests in the United States.

**❺ Interdependence:**
All parts of the earth's **environment** are connected like a web. Any action to one part of the web will cause a reaction in another part. When a **species** becomes extinct, other **species** that **preyed** on it will be harmed. When ecosystems are degraded, all other ecosystems are effected as a result.

**❻ Genetic Diversity:**
The storehouse of genetic variation is necessary for the **survival** of all **species**.

**❼ Diversity:**
The large number of different **species** and the enjoyment derived from them in the natural world makes life more pleasant. We have a responsibility to ourselves and to the earth to keep the diversity found on this planet.

**Compiled from "Saving Species: Nine Reasons You Should Care"**
**Carol Ann Morehead and Rob Sutter**
**North Carolina Plant Conservation Program**

## APPENDIX # 3

# Resources for Land Use

**Groups and agencies that can be a resource for a range of perspectives on land use.**

American Institute of Architects
Education Programs
1735 New York Avenue NW
Washington, D.C. 20006

Army Corps of Engineers
P.O. Box 1890
Wilmington, NC 28402
(919) 251-4748

Carolina Power and Light Company
Brunswick Plant Visitor Center
P.O. Box 10429
Southport, NC 28461
919/457-6041

Chamber of Commerce
P.O. Box 330
Wilmington, NC 28402
919/762-2611

Chamber of Commerce
201 Lumberton Ave.
Carolina Beach, NC 28428
919/458-8434

N.C. Dept. of Transportation
Division Office
124 Division Drive
Wilmington, NC 28401
919/251-5724

N.C. Dept. of Transportation
Public Affairs
P.O. Box 25201
Raleigh, NC 27611
919/733-2520

N.C. Division of Coastal Management
127 Cardinal Drive Ext.
Wilmington, NC 28405
919/395-3900

Ducks Unlimited
Eastern District Director
Steve Thomas
202 Bachelor's Creek Lane
New Bern, NC 28560

Ducks Unlimited
State Chairman
Gordon Quarles
2508 Amity Ave.
Gastonia, NC 28504

Federal Paper Board Company
Riegelwood Operations
Riegelwood, NC 28456
919/655-2211

N.C. Division of Forest Resources
Educational State Forests
512 N. Salisbury Street
Raleigh, NC 27611
(919) 733-2162

N.C. National Estuarine Research Reserve
7205 Wrightsville Avenue
Wilmington, NC 28403
919/256-3721

N.C. Wildlife Federation
P.O. Box 10626
Raleigh, NC 27605-1168
(919) 833-1923

N.C. Wildlife Resources Commission
Division of Conservation Education
512 N. Salisbury Street
Raleigh, NC 27611
(919) 733-7133

National Association of Homebuilders
National Housing Center
15 and M Streets, NW
Washington, D.C. 20005
Attn: Land Development

National Audubon Society
Education Office
Route 4, Box 171
Sharon, CT 06069
(203) 364-0520

National Institute for Urban Wildlife
10921 Trotting Ridge Way
Columbia, MD 21044

National Wildlife Federation
1412 16th Street NW
Washington, D.C. 20036-2266
1-800-432-6564

New Hanover County Board of Commissioners
New Hanover County Administration Building
Room 305
320 Chestnut St.
Wilmington, NC 28401
919/341-7149

New Hanover County Planning Department
New Hanover County Administration Building
320 Chestnut St.
Wilmington, NC 28401
919/341-7165

N.C. Division of Soil and Water Conservation
512 N. Salisbury Street
Raleigh, NC 27611
(919)733-2302

Stream Watch
Division of Water Resources
512 N. Salisbury Street
Raleigh, NC 27611
919/733-4064

The Nature Conservancy - N.C. Chapter
Suite 223
Carr Mill Mall
Carrboro, NC 27510
(919) 967-7007

The Plant Conservation Program
N.C. Department of Agriculture
P.O. Box 27647
Raleigh, NC 27611
(919) 733-3610

UNC Sea Grant
N.C. State University
Box 8605
Raleigh, NC 27695-8605
(919) 737-2454

# Nutrition Chart

APPENDIX #4

| Supplementary Foods | Protein *g* | Carbohydrates *g* | Fat* *g* | Vitamin A IU | Vitamin C *mg* | Potassium *mg* | Total | Rank in Nutritional Value** |
|---|---|---|---|---|---|---|---|---|
| Tuna (3 oz.) | 30 | 0 | (1) | 32 | 0 | 255 | 316 | 12 |
| Hamburger (3 oz.) | 21 | 0 | (16) | 1 | 0 | 256 | 262 | 14 |
| Hot dogs (2) | 13 | 3 | (33) | 0 | 28 | 180 | 189 | 18 |
| American Cheese (2 1/2 oz.) | 8 | .6 | (11) | 429 | 0 | 42 | 938 | 5 |
| Eggs | 12 | 1.2 | (11) | 520 | 0 | 130 | 652 | 6 |
| Cola/Soft Drink | 0 | 35 | 0 | 0 | 0 | 3 | 38 | 20 |
| Iced Tea (w/ lemon & sugar) | .2 | 28 | 0 | 6 | 14 | 19 | 67.2 | 19 |
| Tomato juice | 2 | 10 | (.24) | 1940 | 39 | 552 | 2543 | 3 |
| Peanuts | 9 | 5 | (18) | 5 | 0 | 260 | 261 | 15 |
| Ice Cream | 3.6 | 24 | (11) | 407 | .5 | 193 | 617.1 | 7 |
| Oatmeal cookies (2) | 5 | 40 | (13) | 320 | .5 | 264 | 616.5 | 8 |
| Chocolate Bar | 4.4 | 32 | (18) | 160 | 0 | 218 | 396.4 | 11 |
| Pear | .65 | 25 | (.66) | 33 | 6.6 | 208 | 271.9 | 13 |
| Orange | 1.2 | 15 | (.16) | 269 | 70 | 237 | 592 | 9 |
| Banana | 1.2 | 27 | (.5) | 92 | 10 | 451 | 581 | 10 |
| Watermelon (1 slice) | 3 | 34 | (2) | 1762 | 46 | 560 | 2404 | 4 |
| Broccoli (1 cup) | 5 | 5 | (.5) | 3880 | 140 | 324 | 4353 | 2 |
| Carrots (1 med.) | 1 | 6 | (.13) | 7920 | 6 | 231 | 8163 | 1 |
| Mushrooms (1 cup) | 1.6 | 3 | (.31) | 0 | 2.5 | 256 | 260 | 16 |
| French Fries (10 strips) | 2 | 18 | (7) | 1 | 11 | 199 | 224 | 17 |

*** Fat has been subtracted prior to total.**
**** Rank in nutritional value is in relation to all foods listed.**

Nutritional information taken from The New Laurel's Kitchen.





7.4.1

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## SCHEDULING WORKSHEET

Date request received_____ Request received by_____

1) Name of group (school) _____

2) Contact person _____ _____
name phone (work) (home)

_____
address

3) Day/date/time of requested program _____

4) Program desired and program length _____

5) Meeting place _____

6) Time of arrival at park _____ Time of departure from park _____

7) Number of students _____ Age range (grade) _____

8) Number of chaperones _____

9) Areas of special emphasis _____

10) Special considerations of group (e.g. allergies, health concerns, physical limitations)_____
_____

11) Have you or your group participated in park programs before? If yes, please indicate previous programs attended: _____
_____

If no, mail the contact person a Educator's Guide.

12) Are parental permission forms required? _____ If yes do they have these forms? _____
If they do not, mail contact person a Parental Permission form.

---

I, _____, have read the entire Educator's Guide and understand and agree to all the conditions within it.

Return to: Carolina Beach State Park
Post Office Box 475
Carolina Beach, North Carolina 28428

## PARENTAL PERMISSION FORM

Dear Parent:

Your child will soon be involved in an exciting learning adventure - an environmental education experience at _____. Studies have shown that such "hands-on" learning programs improve children's attitudes and performance in a broad area of school subjects.

In order to make your child's visit to "nature's classroom" as safe as possible we ask that you provide the following information and sign at the bottom. Please note that insects, poison ivy and other potential risks are a natural part of any outdoor setting. We advise that children bring appropriate clothing (long pants, rain gear, sturdy shoes) for their planned activities.

Child's name _____

Does your child:

- Have an allergy to bee stings or insect bites?_____
  If so, please have them bring their medication and stress that they, or the group leader be able to administer it.

- Have other allergies? _____

- Have any other health problems we should be aware of?_____
  _____

- In case of an emergency, I give permission for my child to be treated by the attending physician. I understand that I would be notified as soon as possible.

  _____ _____
  Parent's signature date

Parent's name _____ Home phone _____
(please print) Work phone _____

Family Physician's name _____ phone _____

Alternate Emergency Contact

Name_____ phone _____

## NORTH CAROLINA PARKS & RECREATION
## PROGRAM EVALUATION

Please take a few moments to evaluate the program(s) you received. This will help us improve our service to you in the future.

1. Program title(s) _____ Date _____
   Program leader(s) _____

2. What part of the program(s) did you find the most interesting and useful? _____
   _____

3. What part(s) did you find the least interesting and useful? _____
   _____

4. What can we do to improve the program(s)? _____
   _____
   _____

5. General comments _____
   _____
   _____
   _____

**LEADERS OF SCHOOL GROUPS AND OTHER ORGANIZED YOUTH GROUPS PLEASE ANSWER THESE ADDITIONAL QUESTIONS:**

6. Group (school) name _____

7. Did the program(s) meet the stated objectives or curriculum needs? _____
   If not, why? _____
   _____

**Please return the completed form to park staff. Thank you.**

110

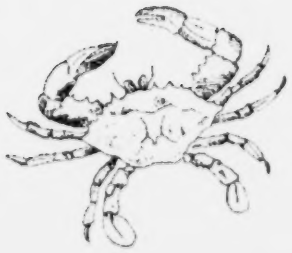
## Notes

## Notes

## Notes

## Notes





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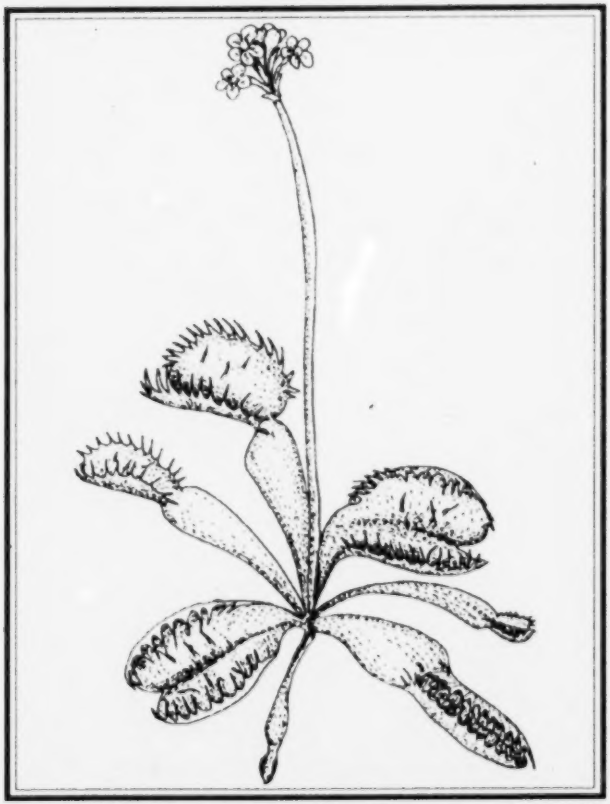
# EDUCATOR'S GUIDE



## Carolina Beach State Park

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115

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Department of Environment, Health,
and Natural Resources

James G. Martin
Governor

William W. Cobey, Jr.
Secretary

5-92

# Introduction to the **North Carolina State Parks System**

Since its creation in 1916, the North Carolina State Parks System has provided its visitors with opportunities for educational experiences and programs. Through the years, we have continued to revise and update our programming to make it more informative and more tailored to the needs of our state's school system.

Our state parks system provides a wonderful outdoor classroom for learning about our North Carolina heritage. Each of our unique state parks offers a variety of environmental education opportunities which highlight our state's natural and cultural resources. All of our environmental education programs are designed to meet curriculum requirements of the North Carolina Department of Public Instruction. Subject areas covered include science, social studies, art, mathematics and communication skills.

The goal of our environmental education program is to generate an awareness in all individuals which cultivates responsible stewardship of the earth.

# Introduction To **Carolina Beach State Park**

Bordered by the Cape Fear River and the Intracoastal Waterway, Carolina Beach State Park is located 15 miles south of Wilmington off of U.S. 421.

Numerous recreation facilities and a variety of educational opportunities make a visit to Carolina Beach a rewarding adventure. The natural resources of this unique coastal area open the door to a world of learning and discovery. One of the most outstanding natural features of the park is its diverse plant communities - eight different plant communities are present within this small area. Here, students can learn how carnivorous plants attract and trap insects; they can explore the wonders of a marsh; or they can climb Sugarloaf, a 60 foot high sand dune overlooking the Cape Fear River.

# Program Options

Our specially developed, curriculum-based environmental education programs are available by reservation only (see section on how to schedule a program). Some of these programs are supplemented by an activity packet which includes suggested activities for before and after your visit.

Programs are geared to different grade levels and include such topics as carnivorous plant adaptations, the telling of local tales, astronomy, seashells and a walk to Sugarloaf. Many of our programs can be adapted to meet special requests.

Groups are also welcome to visit the park for self-guided expeditions.

A special event held annually at the park is Big Sweep - a day of collecting litter from North Carolina's waters. This volunteer program is an excellent means of demonstrating the effects of litter on our environment. We encourage groups of all ages to participate in this event and help in the cleanup of our waters.

# Plant Communities

Eight distinct plant communities within the park offer students the opportunity to compare and contrast these various communities and the adaptations of the different plants that grow in them.

- The dry sand ridge has coarse, sandy soil and a desert-like quality.
- The pine-grass savanna, a dry area dominated by grasses and pines, depends on fire to inhibit the growth of encroaching shrubs.
- The pocosin is a dense evergreen shrub bog with an organic soil. Carnivorous plants grow in the transition zone between the savanna and the pocosin.
- The lime sink ponds are shallow depressions in the underlying limestone filled with rain water. Each pond has an interesting and distinctive plant community. Carnivorous plants such as bladderworts, sundews, pitcher plants and butterworts grow in this area.
- The swamp forest has areas of standing freshwater which causes the bases of trees to become swollen and support the trees like a buttress.
- The brackish marshes along the river are home to a number of salt-tolerant plants.
- The mixed pine and hardwood forest is dominated by longleaf pines and turkey and live oaks.
- Relict sand dunes - such as Sugarloaf, a 60 foot high dune overlooking the river - are scattered with live oak trees draped with Spanish moss.

# Wildlife

The diversity of plant communities found within Carolina Beach State Park creates an extensive range of wildlife habitats.

- A wide variety of birds can be seen throughout the park. Good locations for viewing birds such as herons, egrets, cormorants and ospreys can be found along the river and Snow's Cut.
- Many other species of birds typical of the mixed pine and hardwood forest community can be seen in the picnic and family camping areas. A greater variety of species can be seen in the spring and fall as migrating birds stop by the park to take a rest from their travels.
- Mammals such as deer, fox, raccoons, grey and fox squirrels and opossums make their homes in the park. Signs of these animals can usually be seen while hiking park trails, though the animals themselves may be difficult to see with a group of students.

# Facilities

***Restrooms:*** Restrooms are available at the picnic area and the marina.

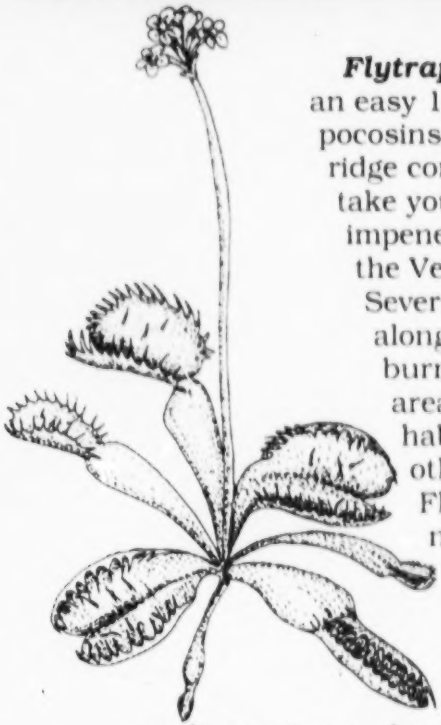
***Picnic Area:*** Picnic tables and grills, available on a first-come, first-serve basis, are located in a shaded forest along Snow's Cut.

***Family Camping:*** Family camping is available year-round on a first-come, first-serve basis. Each camp-site has a grill, picnic table, trash can and gravel pad for vehicle parking. Drinking water is available at locations throughout the campground. The two centrally-located bathhouses have toilets, lavatories and hot showers. Electrical and water hookups are not available. A modest fee is charged for family camping.

***Group Camping:*** Two primitive camping areas are available for organized groups. A small fee is charged for the use of these areas which are available by reservation only. Each camping area has a fire ring, picnic tables, a pit toilet and plenty of space for tents. A shallow well is located between the camping areas; this water is primarily used for washing. Drinking water can be obtained from the park office or the picnic area. There is no vehicular access to the group camping area. Campers must park at the nature trail parking lot and carry their gear 1/2 mile to the site.

***Marina:*** The marina is located at the end of the park road. The launching ramp provides boaters with access to the Cape Fear and Snow's Cut. Boat slips, fuel, restrooms and a snack bar/sales area are available.

# Trail Descriptions



***Flytrap Loop Trail:*** This is an easy 1/2 mile walk through pocosins, savanna and dry sand ridge communities. Boardwalks take you through dense impenetrable pocosins and the Venus flytrap habitat. Several native orchids bloom along the trail. Controlled burning is practiced in this area to maintain the habitat for the flytraps and other wildflowers. The Flytrap Trail begins at the nature trail parking lot.

***Sugarloaf Trail:*** Sugarloaf Trail begins at the marina parking lot. The three mile trail is marked with yellow circles. It follows the Cape Fear River to Sugarloaf, a distance of one mile, crossing several tidal marsh inlets. This is an excellent area for watching water birds and for a close-up view of a marsh. The hiker who climbs Sugarloaf dune is rewarded with a spectacular view of the river and marshes.

The trail continues for two miles from Sugarloaf to the lime sink ponds and then travels through the dry sand ridge plant community to intersect the Campground and Swamp trails before returning to the marina.

122

***Campground Trail:*** The Campground Trail begins at the family campground and joins the Sugarloaf Trail. This 3/4 mile trail is marked with blue circles and takes the hiker through a mixed pine and hardwood plant community.

***Swamp Trail:*** The Swamp Trail begins and ends at points along the Sugarloaf Trail. This one mile trail, marked with red circles, provides access to the two group camping areas.

***Snow's Cut Trail:*** This 1/2 mile trail parallels Snow's Cut, a portion of the Intracoastal Waterway, from the picnic area to the family campground. It travels through a mixed pine and hardwood plant community, an excellent area for fishing and bird watching. Hikers are advised to stay on the trail since Snow's Cut has steep banks and dangerous currents.

**All trail distances are one way unless otherwise noted.**

## Guidelines For A Rewarding Field Trip Experience At Carolina Beach State Park

Groups are encouraged to visit the park during all seasons of the year for hikes, exploration, environmental education programs and activities. Leaders may choose to conduct their own activities or enlist the help of the park staff.

### Scheduling a Trip

To make a reservation, contact the park at least two weeks in advance. Please provide the following information:

- Name of group (school)
- Name, address, work and home telephone numbers of the group contact person.
- Date, time of arrival, and meeting place at the park.
- Departure time from the park.
- Number of participants and adult leaders. **A maximum of 30 participants is recommended. Please have one adult leader per 10 students.** Adult leaders are responsible for maintaining control of the group.
- Age range and/or special needs of participants.
- Desired activities; assistance needed by park staff.

## Before You Make The Trip

1. Visit the park without the participants prior to the scheduled group trip. This will give you a chance to become familiar with facilities and park staff, and provide you with an opportunity to identify potential problems.
2. Discuss behavior expectations with adult leaders and participants when planning the trip. Discuss the park rules listed. Emphasize safety.
3. Inform the group about poison ivy, ticks and chiggers. Discuss the need to use insect repellant from late spring to late fall.
4. Inform your group of the need to dress appropriately for the season. Walking shoes are suggested for all seasons. The weather can be very hot and humid from late spring through early fall. Sunscreen and hats are advised.
5. Have everyone wear a name tag. For safety, please color-code them (for groups) and establish a buddy system.
6. **Group leaders are responsible for obtaining a consent form from each participant including a listing of any health considerations and medical needs.** These forms are available at the park.
7. If your group plans to collect any plants, animals or minerals within the park a Research Activity Permit is required. Contact the park to obtain a permit application.
8. **If you will be late or need to cancel your trip, please notify the park as far ahead as possible.**

## While at the Park
## Please obey the following rules:

1. To help you get the most out of the experience and increase the chance of observing wildlife, be as quiet as possible while in the park.
2. On hikes, walk behind the leader at all times. Stay on the trails. Running is not permitted.
3. All plants and animals within the park are protected. Breaking plants and harming animals is prohibited in all state parks. This allows future visitors the same opportunity to enjoy our natural resources.
4. Picnic in designated picnic areas only. Help keep the park clean and natural; do not litter.
5. Swimming is not permitted in the park.
6. Snow's Cut is a dangerous body of water with sharp drop-offs and dangerous currents. Please make your group aware of safety precautions.
7. In case of accident or emergency, contact park staff immediately.

## Following the Trip

1. Complete post-visit activities in the Environmental Education Learning Experience packet.
2. Build upon the field experience and encourage participants to seek answers to questions and problems encountered at the park.
3. Relate the experience to classroom activities and curriculum through reports, projects, demonstrations, displays and presentations.
4. Give tests or evaluations, if appropriate, to determine if students have gained the desired information from the experience.
5. File a written evaluation of the experience with the park. Evaluation forms are available from park staff.

# Park Information

**Address:**

Carolina Beach State Park
Post Office Box 475
Carolina Beach, North Carolina 28428

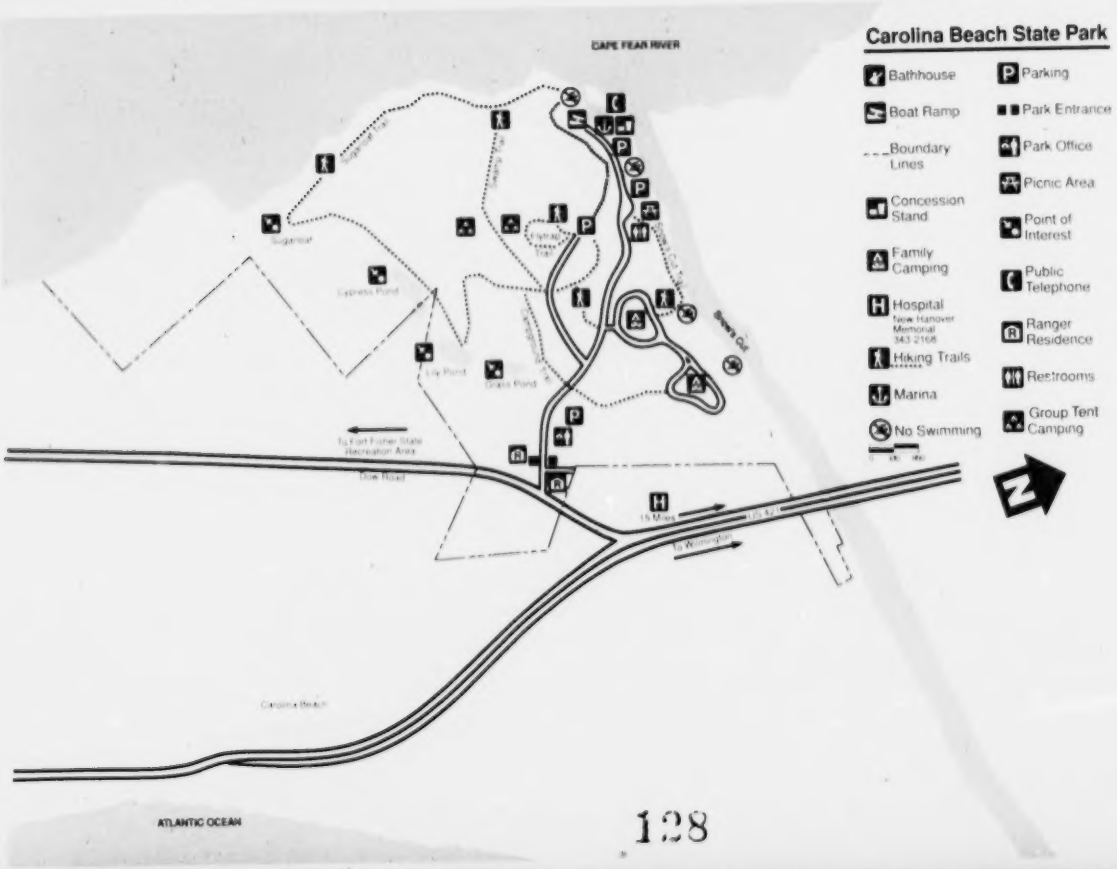
**Telephone:**

(919) 458-8206 Park Office
(919) 458-7770 Marina

**Hours of Operation:**

| | |
|---|---|
| November-February | 8:00-6:00 p.m. |
| March, October | 8:00-7:00 p.m. |
| April, May, September | 8:00-8:00 p.m. |
| June-August | 8:00-9:00 p.m. |

127


CAPE FEAR RIVER
Carolina Beach State Park
Bathhouse
Boat Ramp
Boundary Lines
Concession Stand
Family Camping
Hospital
New Hanover Memorial 343-2168
Hiking Trails
Marina
No Swimming
Parking
Park Entrance
Park Office
Picnic Area
Point of Interest
Public Telephone
Ranger Residence
Restrooms
Group Tent Camping
N
Sugarloaf
Cypress Pond
Flat Point
Drake Pond
Spartina Trail
Loggerhead Trail
Sharks Cut
To Fort Fisher State Recreation Area
Dow Road
To Wilmington
Carolina Beach
ATLANTIC OCEAN

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# Educational Activities Available at Carolina Beach State Park

**Carolina Beach State Park**
**Post Office Box 475**
**Carolina Beach, North Carolina 28428**
**Telephone: Office (919) 458-8206 Marina (919) 458-7770**

The following is a list of educational programs offered by park staff at the park and other locations. Ask park staff about new programs that may have been added to the list.

## PLANTS THAT BITE BACK

### An Environmental Education Learning Experience

**DANGER! Unwary students may have fun while learning.**

The environmental education learning experience, Plants that Bite Back, focuses on the five carnivorous plants that grow in Carolina Beach State Park. It includes a series of hands-on activities, as well as educator and student background materials, vocabulary, lists of curriculum areas and measurable objectives, references and worksheets. Developed for the middle school grades, the activity packet meets established curriculum objectives of the North Carolina Department of Public Instruction in a variety of subject areas. Activities include pre-visit, on-site and post-visit activities. Students will be exposed to such major concepts as plant adaptations, folklore, resource management and preservation. Time required varies depending upon activities chosen.

## OTHER PROGRAMS

- **Plant Adaptations**
  A discussion and walk through a variety of communities to discover plant adaptations. May be geared to any grade level.
  Time: 2 hours.

- **Hike To Sugarloaf**
  A 3 mile hike on Sugarloaf Trail to observe and discuss the natural and cultural history of the area. Grade Levels 5 and up.
  Time: 1 1/2 hours.

- **Recycling for the Birds**
  An activity designed to teach students to be non-wasteful consumers. Students will construct bird feeders from household trash. Note of caution: knives are used. Program may be conducted in the park or at your location. Grade Levels 5 and up.
  Time: 45 minutes.

- **Reading Animal Signs**
  Learn how to read the animal signs left along the Cape Fear River at low tide. Designed for grade levels 4 and 5, but can be adapted to any level.
  Time: 45 minutes.

- **Plastic Pollution- Become Part Of The Pollution Solution**
  Slide program and activities to inform students of ways to reduce plastic pollutants. Conducted at your location. May be geared to any grade level.
  Time: 45 minutes.

- **Gifts From The Sea**
  Live animal demonstration using mollusks and other shellfish found locally. This program stresses that the seashells we find are remnants of once-living creatures. Conducted in the park or at your location. May be geared to any grade level.
  Time: 45 minutes.

- **Bird Watching**
  A program designed to develop the students' interest in the adaptations of birds commonly found at Carolina Beach State Park. Grade level 5 and up.
  Time: 1 hour.

- **A Historical Look At Medicinal Plants**
  This slide program is designed to develop the students' interests in plants found at Carolina Beach State Park which were once used medicinally. Conducted at your location. Grade levels 6 and up.
  Time: 45 minutes.

- **Life In The Estuary**
  This marsh hike introduces students to the importance of estuaries and marshes and the diversity of life found in these habitats. Grade levels 5 and up.
  Time: 1 1/2 hours.

Other programs may be developed upon request. Call the park office for further information.